Open source, open minds?

An investigation into attitudes towards open source library management systems in UK higher education libraries

John Dalling

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Department of Information Studies

Aberystwyth University

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Summary

This study sought to investigate why higher education libraries in the United Kingdom have been reluctant to select open source library management systems (LMSs).

A literature review revealed the historical background to open source LMSs and their advantages and disadvantages. Using social research methods, the study then examined how higher education librarians perceive these systems and sought reasons why they have yet to be embraced. Finally, analysis of the results was undertaken and compared with relevant literature to investigate whether attitudes are likely to change in the future, and suggest whether open source LMS adoption will increase.

A quantitative online questionnaire was used to gain a broad overview of current attitudes to open source LMSs; this was sent to all 181 libraries within the UK higher education sector found to have reliable contact details, and received a response rate of 46.4%. The questionnaire was followed by qualitative telephone interviews with five selected professionals to examine in detail the reasoning behind different opinions.

The results suggest that UK higher education libraries rely on peer feedback when choosing a LMS. With limited experience and a need for strong commercial support given uncertainty about staffing in the present financial climate, librarians within the sector are reluctant to choose open source LMSs. Participants also demonstrated a lack of motivation to change from current LMSs, suggesting limited adoption of alternatives in the near future. A higher number of questionnaire respondents reported considering adopting an open source LMS than in Adamson et al. (2008), however this may be due to open source advocates being more likely to participate.

Increased use of open source LMSs in the longer term may depend on the experience of any pioneers adopting these systems within the sector, and whether they are overtaken by newer cloud-based alternatives currently being developed.

Declaration

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed ..... (candidate)

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Statement 1

This work is the result of my own investigations, except where otherwise stated. Where ***correction services** have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged (e.g. by footnotes giving explicit references).

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Abbreviations and acronyms

Alma	Web-based unified library resource management system from Ex Libris
API	Application Programming Interface
BCC	Blind Carbon Copy: a method of ensuring email addresses of multiple recipients remain private
CDS/ISIS	Information storage and retrieval software developed by UNESCO
CyMAL	Museums, Archives and Libraries Wales: Welsh Assembly Government body
Endeavor	Former library management system vendor
ERM	Electronic Resources Management
Evergreen	An open source library management system developed by the PINES consortia
Ex Libris	Library management system vendor
FOSS	Free and Open Source Software
Geac	Geac Computer Corporation: former library management system vendor
GNU	GNU's Not Unix: project launched to develop a free computer operating system
GPL	GNU General Public Licence: free software licence released in 1989
H.E.	Higher Education
HEFCE	Higher Education Funding Council for England: UK government body
Horizon	A library management system
IP Address	Internet Protocol address, uniquely assigned to every device accessing the Internet
JISC	Joint Information Systems Committee
Koha	An open source library management system developed in New Zealand in 1999
LAMP	Linux, Apache, MySQL, PHP / Perl: a commonly used server software combination
LMS	Library Management System
LMSs	Library Management Systems
MARC	MAchine-Readable Cataloguing
OPAC	Online Public Access Catalogue
OSS	Open Source Software
PINES	Public Information Network for Electronic Services: public library consortium, Georgia, USA
SCONUL	Society of College, National and University Libraries
SirsiDynix	Library management system vendor
SPSS	A computer program for statistical analysis
Talis	Library management system vendor
UCAS	University and Colleges Admissions Service
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organization
Unicorn	A library management system
US	United States
VLE	Virtual Learning Environment
VuFind	An open source OPAC developed by Villanova University, USA
Y2K	Year 2000: a date-related software bug caused by a two digit year identifier

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1. Introduction

1.1 Background to the study

UK higher education is undergoing a period of rapid change. Since 1998, students in England and Wales have seen a reduction in grants and the introduction of tuition fees, while universities have had to seek new methods of funding with government subsidies cut as a result of deficit reduction strategies (Higher Education Funding Council for England, 2011, p. 2). With students now taking on the role of consumers and universities seeking to maximise efficiency following budget reductions, higher education libraries are under rising pressure to provide a cost-effective customer focussed service.

Libraries have been using computer systems since the 1960s to help manage and process information. By the beginning of the 21st century, most were using a library management system (LMS) (Tedd, 2007c, p. 14) to control their circulation and patron data, stock, and acquisitions processes. The LMS now forms an integral part of a library, acting as the central database to link resources held with the patrons who use them, and consumes a significant portion of the library budget in maintenance and licence costs (Boss, 2009).

Free alternatives to commercial programs have been popular since the advent of personal computing, and open source licences, introduced in 1998, extend the concept of freedom by providing access to software source code for redevelopment. The first open source LMS, Koha, was developed in 1999, and in recent years this and other open source LMSs have received mention in the library press following adoption by high-profile consortia overseas.

Given the financial pressures currently facing UK academic libraries and the rise of open source LMSs as a viable option (Breeding, 2008b, p. 8), the two would seem to be an ideal partnership. Although UK school and health service libraries had chosen open source LMSs by 2007 (Tedd, 2007a), it took a further three years before a UK university announced their intention to adopt one.

1.2 Aims and objectives

1.2.1 Research question

The original intention for the study was to investigate whether open source LMSs are a viable option for UK higher education. Following the literature review, the research

question was constructed as “What are the attitudes towards open source LMSs in UK higher education libraries?”, since the study aims to gather professional views through social research rather than directly compare open source LMSs with their commercial counterparts, which has already been done by Hughes (2010).

1.2.2 Research purpose

This research will investigate attitudes to open source LMSs in UK higher education libraries. The study will try to establish why the sector has been slow to adopt this emerging technology, and how attitudes towards open source LMSs in UK universities might change in the future.

1.2.3 Objectives

The specific research objectives are as follows:

1. To gain a historical background to open source LMSs;
2. To investigate advantages and disadvantages of open source software through analysis of the literature;
3. To research how librarians in the sector perceive these advantages and disadvantages in relation to LMSs;
4. To identify reasons why UK higher education libraries have yet to embrace open source LMSs;
5. To investigate whether attitudes are likely to change in the future.

1.3 Scope

The research is limited to exploring the views of those working with LMSs within the UK higher education sector. To make the study manageable within the time available, the researcher sought one quantitative survey response from each library within the sector, and to ensure maximum validity a strategy was employed to select the most suitable member of staff for this purpose, as detailed in section 3.5.2. Five qualitative interviews were also conducted with selected respondents.

The decision to limit the scope to UK higher education is timely; although there were no libraries within the sector using open source LMSs on commencement of the research,

during the study it was announced that Staffordshire University would be adopting Koha (Dimant, 2010b).

1.4 Structure

This dissertation is divided into six chapters. The research began by seeking a background to open source LMSs from relevant literature, as well as potential advantages and disadvantages to the open source model and reasons why open source LMSs have yet to be embraced in UK higher education; the results of this investigation are presented in Chapter 2. Information from the literature was then used to construct a questionnaire and interview schedule following the methodology outlined in Chapter 3. Analysis of the results is presented in Chapter 4, and is further discussed with reference to the literature in Chapter 5 which also highlights suggestions for further study. Chapter 6 summarises the study and evaluates the research process.

1.5 Referencing

The Harvard American Psychological Association (APA) citation style is used throughout this dissertation.

2. Literature Review

2.1 Methodology

The literature review was conducted in two phases: an initial search to establish an information base for the research proposal, followed by a structured search to uncover a body of literature appropriate to the study. Key terms relating to LMSs and open source software gathered through the initial search were entered into a colour-coded matrix alongside a list of available sources to provide a search structure (Appendix A). Boolean logic was used to search for every combination of terms within the two categories and identify as much literature as possible covering both topics.

Each search term was then entered individually. While this returned too many results to analyse given time constraints, a review of the top ranking and most recent results provided a useful source of background literature.

Due to time restrictions, only English language material was consulted and results were date limited to 2003 or later; several influential earlier sources were discovered through 'snowballing', studying bibliographies of relevant articles. Although open source LMSs used by non-English speaking communities were identified, e.g. Gnuteca and PMB (Balnaves, 2008, p. 3), little material relating to these was found, possibly due to the language limitation. Since the research is based within the context of UK higher education, where these systems are unlikely to be relevant, this was not considered enough of a shortcoming to warrant further investigation.

2.2 Results

Much of the literature relating to open source LMSs was found to be journalistic (e.g. Chad, 2007), historical (e.g. Tedd, 2007a) or of case studies (e.g. Helling, 2010), with little empirical research. This is unsurprising given that these systems have only recently been considered viable and suggests further research would be welcome. Research into attitudes towards LMSs was found, with some touching on open source systems (e.g. Breeding, 2010), as well as research into library professionals' attitudes towards open source software in general (e.g. Rafiq, 2009).

A large proportion of relevant literature was found to be North American, reflecting both the popularity of open source LMSs and the number of libraries in this region. UK literature was considered important, and of particular relevance is the JISC and SCONUL Library Management Systems Study, which intended to "undertake an evaluation and horizon scan of the library management and related systems landscape for UK Higher Education" (Adamson, Bacsich, Chad, Kay & Plenderleith, 2008, p. 5). This report briefly touches on open source systems, but its primary value was in providing an overview of current use of LMSs within the sector, to help place international literature into context.

2.3 Library management systems

2.3.1 Historical perspective

A LMS can be defined as a:

> *"computerised information system that uses a single bibliographic database and a set of interrelated application programs to automate multiple library applications"* (Saffady, 1999, p. 209).

There is a long history of automation in libraries, with punched cards being used as far back as the 1930s (Mutala, 2008, p. 108). In the 1960s, several libraries started to experiment with computers to assist information processing (Tedd, 2007d, p. 309). These early systems developed into the first integrated LMSs (Saffady, 1999, p. 209). In 1979 the first turnkey LMS, with hardware and software supplied as an integrated package, was introduced to the UK by Geac (Tedd, 2007d, p. 314). This technology allowed libraries to provide new functionality such as the Online Public Access Catalogue (OPAC) (Kinner & Rigda, 2009, p. 403).

The LMS was functionally complete and featured an OPAC, MARC support and modules for circulation, cataloguing, acquisitions, serials management and inventory control by the late 1990s (Andrews, 2007, p. 573). The rising popularity of the Internet at this time, however, started to have an impact on libraries, with the introduction of digital collections, heightened public expectations towards interfaces, and shifting attitudes towards data and software openness (Breeding, 2007b, p. 39).

Over the last decade, the LMS has been supplemented by a growing range of add-on products designed primarily to aid libraries in managing digital collections. The OPAC has

been superseded by next generation interfaces working independently from the LMS (Breeding, 2007b, p. 39) and characterised by Web 2.0 functionality, such as user tagging and reviews, faceted navigation and vertical search capabilities (Trainor, 2009, pp. 292-293). Other programs key to modern library operations have emerged independently of the LMS, such as electronic resource management (ERM) software and institutional repositories (Pace, 2009, p. 645).

2.3.2 External applications

The recent focus on external applications has caused some commentators to believe that the LMS has lost significance. Bartlett (2009) argues that the lack of practitioner interest at the UK Umbrella 2009 conference reflects the "growing irrelevance" of the LMS. Ruschoff (2008, p. 1) believes that the development of independent discovery interfaces illustrates that the LMS "can no longer do everything, no less do it well", while the SCONUL Shared Services study recommends that "the traditional LMS is disaggregated" allowing data interchange to share services (Sero Consulting Ltd., 2009, p. 43).

Breeding disagrees that the LMS is becoming irrelevant (2007b, p. 39), and believes that the development of external products represents a backward step. Breeding (2005) blames cost for the segregation, claiming the library market would not tolerate the price of such programs being embedded into the core LMS.

2.3.3 Financial considerations

Financial constraints may also be responsible for the recent lack of development to the LMS. Wang (2009, p. 209) contrasts the mounting price tag for new technologies with the "limited or shrinking budget" faced by many libraries, not helped by the recession (Breeding, 2009d), and software vendors have found that customers are unable "to pay realistic licensing fees" (Schneider, 2009, p. 17). This situation is further exacerbated by the saturated market, with vendors relying on existing customers for income (Rhyno, 2008).

Chudnov (1999) reports that libraries are "largely not-for-profit publically funded agencies" who "hardly command a voice in today's high tech industry"; there is therefore only a small market for library systems vendors. Adamson et al. report that the UK LMS market is "relatively insignificant in the global corporate context" (2008, p. 8) and "dominated by four vendors with little differentiation" (2008, p. 5); they believe that the LMS replacement cycle

in UK higher education is particularly slow (2008, p. 17) with one difference to the North American market being the lack of rich, privately funded UK institutions (2008, p. 75).

2.3.4 Shared Services

Over the last decade there has been a move towards library consortia in North America, reducing management costs while offering greater customer choice through reciprocal borrowing. This has presented challenges to the LMS market; larger collections and higher transaction loads must be handled, and individual library needs must be balanced with resource sharing and collective policies (Breeding, 2008b, p. 27).

Despite an agenda towards collaboration in UK libraries, evident in the CyMAL Action Plan 2008 - 2011 (Welsh Assembly Government, 2008) which prioritises delivering through partnerships, there has been little movement towards library consortia in UK higher education even with "strong and widespread interest in shared services" (Sero Consulting Ltd., 2009, p. iv). Adamson et al. (2008, p. 95) believe that collaborative LMS provision could be beneficial for the sector, especially since competitive advantage can no longer be derived from the LMS.

The SCONUL Shared Services study (Sero Consulting Ltd., 2009, pp. vi, 43) advocates an "e-Content Licensing Scheme integrated with a total Library Management and Services Platform", one aspect of which is a shared system to manage local print collections, possibly based on an open source model such as the Kuali Open Library Environment, a forthcoming "enterprise-ready, community source software package for academic and research libraries" (Kuali Foundation, 2010).

2.3.5 Interoperability

The current demand for interoperability is a key theme in the literature. Kinner and Rigda (2009, pp. 405-6) believe that the future of the LMS will depend on the willingness of vendors to allow other products to work with core modules. Allowing the LMS to share data with Finance and Human Resources systems could be advantageous (Ruschoff, 2008, p. 13), while integration with the Virtual Learning Environment would be beneficial for academic libraries (Adamson et al., 2008, p. 59).

Vendors have recognised that interoperability can create new business opportunities in a saturated market (Adamson et al., 2008, p. 19), and this has led to the development of Application Programming Interfaces (APIs). APIs were a recurring theme in an article exploring future LMS developments, with many experts believing current provision does not go far enough (Bahr, 2007).

2.3.6 Product consolidation

Over the last decade, mergers have dominated the LMS industry, with the buyout of Dynix by Sirsi in 2005 (Rogers, 2005) and the acquisition of Endeavor by Francisco Partners, owners of Ex Libris, in 2006 (Ex Libris, 2006) being notable examples. This has resulted in popular LMS products being discontinued leading to frustration as libraries feel forced to migrate to new LMSs which "may not be much better than the old system" (Wang, 2009, p. 210). The decision by SirsiDynix to discontinue development of its Horizon LMS led to British Columbia public libraries considering the Evergreen open source LMS, as the risk associated with it "was suddenly no greater" than that associated with a proprietary system (Hyman & Walker, 2008, p. 4).

2.4 Open source

Open source software (OSS) can be defined as software:

> *"whose source code is available under a licence... that permits users to use, change and improve the software, and to redistribute it in modified or unmodified form. It is often developed in a public, collaborative manner."*
> (Time Magazines, as cited in Rafiq, 2009, p. 137).

OSS contrasts with proprietary software, which is distributed in binary form and whose developers closely guard the source code (Breeding, 2007a, p. 27).

The term "Open Source" dates from 1998, the result of a brainstorming session by proponents of the free software movement in response to the release of the Netscape Navigator browser source code (Raymond, 1998). The origins of OSS can arguably be traced much further back. In the 1950s, most software code was openly accessible, with the fledgling computer industry generating all of its income from hardware (Glass, 2005, p. 90). As a response to the developing commercial software industry, Richard Stallman launched

the GNU Project in 1983 and published the first GNU Public Licence (GPL) in 1989 (Jaffe & Careaga, 2007, p. 2).

Stallman has opposed the term "open source" and continues to promote the "free software" label based on similar principles (Keats, 2008, p. 3); the umbrella term "Free and Open Source Software" (FOSS) is therefore often used to refer to software released under both labels. The term "open source" has been used throughout this dissertation as the existing free LMS products are all currently promoted as OSS.

Since its inception OSS has gained popularity in Web applications, where the LAMP (Linux, Apache, MySQL, PHP / Perl) server foundation has become commonplace (Jaffe & Careaga, 2007, p. 4). By 2007, the UK government were encouraging the use of open source to promote open standards and increase return on investment (Everett, as cited in Chad, 2007).

2.4.1 OSS in libraries

The synergy between the open source movement and libraries is a recurring theme in the literature (e.g. Rhyno, 2008; Krishnamurthy, 2008, p. 52; Rafiq, 2009, p. 138). Jaffe and Careaga (2007, p. 1) believe both libraries and OSS are based on "shared values of openness and accessibility", and Chudnov (1999) claims that the "ethos and style of OSS is akin to the traditional values of librarianship". Despite this, evidence suggests libraries have been slow to adopt OSS. Jaffe and Careaga (2007, p. 8) found only around 41% of library web servers running open source software, far lower than the 73% of respondents to a general survey, and while there are many articles in the literature about open source in libraries few of these are case studies (Jaffe & Careaga, 2007, p. 10).

Chudnov (1999) does not believe this is a coincidence; since libraries are community resources, he argues, librarians are naturally liberal about access yet conservative about data. Adamson et al. (2008, p. 85) believe this leaves libraries in danger of failing to respond to technological innovation. Hoy and Koopman (2008, p. 60) argue that, due to the risk averse nature of libraries, many only consider OSS for non-critical services, and that the parent institution's information technology infrastructure may dictate what library software can be used, with the academic environment being notoriously conservative in this respect (2008, p. 57).

This negative attitude may not be helped by myths circulating about OSS; these include OSS only being suitable for developing countries, not being ready for prime time, always requiring a local installation and being "junky" and developed by a "hacker-wannabe" (Schneider, as cited in Trainor, 2009, p. 291).

2.4.2 Advantages and disadvantages

Cost is often cited as one of the advantages to OSS, with Poynder (2001) believing it to be "essentially free". Chudnov (1999) acknowledges that costs are inevitable but believes that it is advantageous to pay for personnel, training and support over software. By contrast, Hoy and Koopman (2008, p. 59) acknowledge that the total cost of ownership is hard to define for OSS and may even be greater. Randy Metcalfe, manager of OSS Watch, the JISC open source advisory service, believes that the cost of OSS is comparable with proprietary solutions (Caldwell, 2007, p. 18).

Peer review development is a widely acknowledged advantage to OSS. Chudnov (1999) believes community-based coding can facilitate enhancements for minority users such as the visually impaired, who would not be seen as a priority for commercial developers. Balnaves (2008, p. 2) highlights the benefit of being able to evaluate OSS based on the community, the code itself, and the development process.

Opening up source code can lead to vendor independence and increase support options although at present each open source LMS is only supported by a single company in most countries (Breeding, 2008b, pp. 12-14). Support becomes the primary revenue stream for companies promoting OSS (Schneider, 2009, p. 17) as the code itself carries no monetary value. OSS cannot be bought by a competitor unlike proprietary systems (Bissels, 2008, p. 308), and the model also allows unrestricted testing and evaluation (Breeding, 2008b, p. 25).

Schneider (2009, p. 17) claims that OSS presents interoperability advantages, especially through greater use of open standards. Breeding (2009e), however, notes that the two leading open source LMSs "lag behind proprietary systems in terms of customer facing APIs".

Stability is one issue which divides commentators. Raymond's (1999, p. 41) argument that more developers can find and fix more bugs is often quoted by open source advocates,

including Evergreen developer Robert Molyneux (2009, p. 29) who states that “many eyes looking at software makes better code”. Sceptics argue that development is not systematic; Glass (2005, p. 84) believes that OSS developers “heavily review code of interest” while the remainder is rarely enhanced. Breeding (2009b, p. 24) and Lynch (as cited in Hadro, 2009b) believe that, in the open source LMS market, excessive focus on achieving parity with proprietary software stifles innovation, an argument employed by SirsiDynix’s Stephen Abram (2009) who believes OSS developers spend most of their resources “getting back room operations right”. A comparison of Evergreen against the UK Core Specification of Functional Requirements for Library Systems (Hughes, 2010) suggests some functionality is lacking in its circulation and acquisitions modules.

Many writers believe that using OSS requires technical ability, due to its “emphasis on bare-metal interfaces and text heavy script configurations” (Schneider, 2009, p. 18) and the “high level of technical knowledge required” for installation and maintenance (Poynder, 2001). This may be misleading; mature OSS projects “may have little development burden” (Jaffe & Careaga, 2007, p. 10) and many users may have no desire to alter the source code.

Developing and maintaining quality documentation can also be an issue with OSS (Schneider, 2009, p. 18), since many developers do not possess the necessary writing skills (Rafiq & Ameen, 2008, p. 606). Documentation is arguably more important with OSS as training is unlikely to be available unless provided by a third party. Rafiq and Ameen (2008, p. 607) believe it is necessary to plan a staff and end-user training program before initiating an OSS installation.

Providing access to the source code can also lead to forking, where a program is taken in different directions by separate developers to the extent that altered versions no longer remain compatible. St. Laurent (2004, p. 172) claims that “in addition to creating hard feelings, such forks undermine the foundation of the open development process”. Forking may happen when “not all changes are accepted into the code base” (Glass, 2005, p. 88) and therefore extensive customisation may mean that users “end up with an outlier version” (Abram, 2009).

2.5 Open source library management systems

2.5.1 Background

Not long after the term 'open source' was coined, Chudnov (1999) wrote a column advocating this method for LMS development. The same year work began on Koha, the first open source LMS, developed in New Zealand to replace an ageing system deemed unsuitable for the Y2K date switchover. The system was commissioned when no suitable proprietary system was found, and released under the GNU GPL to aid longevity and promote development (Ransom, Cormack, & Blake, 2009).

Despite the US Association of Research Libraries keystone principles stating "libraries will create interoperability in the systems they develop and will create OSS" (Poynder, 2001), open source LMSs were still not considered viable by Breeding in 2002, who claimed "both broad historical and recent trends argue against" such developments. That year, the Nelsonville Public Library in Ohio, USA, adopted Koha and sponsored the development of MARC21 support, which served to increase interest in the system (Breeding, 2008b, p. 17).

In 2004, the Georgia PINES consortium elected to develop their own open source LMS, Evergreen, due to the failure of their Unicorn system in handling high transaction loads (Molyneux, 2009). Evergreen has since attracted interest from other consortia including a Canadian academic library consortium, Project Conifer (Rhyno, 2008); prior to this Evergreen had only been used by public libraries (The Conifer Group, 2007).

Koha and Evergreen are not the only open source LMSs. Arguably the first library system to follow an open source model was CDS/ISIS (Tedd, 2007a), distributed by UNESCO, which Rhyno (2008) describes as "the most deployed library application on the planet". CDS/ISIS is not a complete LMS but a database management system for bibliographic data (Hopkinson, 2009, p. 307). Balnaves (2008, p. 3) identifies several other open source library systems in use around the world including Gnuteca, a Brazilian system with Portuguese documentation, and PMB, a French system with only partially complete English templates.

2.5.2 Procurement

Breeding (2008b, p. 21) notes that open source LMSs have affected the UK less than North America, and suggests the more formalised European procurement process could be

responsible. In order to gain widespread adoption, OSS must perform well against procurement procedures (Breeding, 2008a, p. 38) such as the European Invitation To Tender (ITT) legislation derided by Adamson et al. as "costly, time consuming and complex" (2008, p. 77). OSS Watch note that selecting a procurement process effectively means choosing between commercial software and OSS (Chad, 2007), and Jaffe and Careaga (2007, p. 11) argue that "if the purchasing department employs [a procurement] process or requires signed vendor contracts it is going to be... harder to get open source in the door".

2.5.3 Software-as-a-Service

Pace (2009, pp. 647-648) claims that "increasing levels of trust [are] being placed in cloud computing by [the] younger generation", and mirroring this development is Software-as-a-Service (SaaS), where the vendor or a third-party company provides hosting, upgrades and maintenance. SaaS is becoming popular among smaller overseas libraries and is being offered both by proprietary LMS vendors and open source support companies such as LibLime (Breeding, 2009a).

Commercial support is seen as a key ingredient in adoption of open source LMSs (Breeding, 2008a, p. 38). This may be because libraries are unlikely to switch from contracted maintenance to paying for local support (Breeding, 2002). When the vendor is responsible for hardware maintenance, Breeding argues, "the perception that OSS implementation requires more in-house expertise no longer applies" (2008a, p. 39). Of the libraries that implement open source LMSs, "the vast majority... work with commercial companies" (Breeding, 2009b, p. 21). Adamson et al. (2008, p. 31) claim that SaaS could help "leverage consortium buying power" and that a "consortium of H.E. libraries... could benefit from a critical mass of reader feedback and click patterns as well as from reduced maintenance costs" (2008, p. 34).

While this model may lead to increasing uptake of open source LMS, it arguably also blurs the boundaries between open source and proprietary software. Hopkinson (2009, p. 311) claims there is little difference "between paying a developer or a third party" and that institutions may feel "no differently being supported by the commercial OSS support companies" than by proprietary vendors.

Unlike other open source projects such as Linux, where hobbyists provide much of the code, most development in open source LMSs is sponsored by libraries (Breeding, 2009b, p. 23). One significant move is the launch of Enterprise Koha, a SaaS version hosted by LibLime, where development will focus on features requested by customers and will first be made available to subscribers before being later added to the code base. This was seen as a fork (Hadro, 2009a), though because the software is hosted it is not in breach of the GPL licence (Tennant, 2009). O'Reilly (2005, p. 466) claims that similar models, used by Google and Amazon, "provide[s] the most serious challenge to the traditional understanding of FOSS" by hosting commercial implementations of open source software without being constrained by GPL protection, which is only triggered by software distribution.

2.5.4 UK perspective

Tedd (2007a) reports several open source LMS installations in the UK. One of the first was at Handsworth Grammar School, who implemented Koha in 2005. Koha was also chosen by the NHS Eastern Counties Library and Knowledge Services Alliance in 2007. UK public libraries have been slower to adopt open source LMSs, though the February 2011 announcement of Stirling and East Dunbartonshire Councils' selection of Evergreen (Shell, 2011) illustrates a significant move in that direction. Staffordshire University are, to date, the only UK higher education library to have announced their intention to use an open source LMS (Dimant, 2010b).

Bartlett (2009), on the Talis Panlibus blog, claims that "despite the pockets of evangelistic fever" there is "no groundswell of interest" in open source LMSs in the UK This was challenged by respondents to another of Bartlett's blog posts (2010), with one believing that attendance at open source events illustrate an "undoubted level of interest in the UK" and that lack of in-house expertise, trends towards outsourcing IT services and no library wanting to be the first to move were the reasons behind a lack of UK adoption.

Tedd (2007a), however, believes that an "OSS approach could be considered" for LMSs, and Caldwell (2007, p. 18) writes that "the next step for university libraries will be to consider open source solutions for their core integrated library system". Chad (2007) agrees that open source LMSs are now a viable solution and questions why they have yet to be adopted in the UK, proposing differences in procurement processes and attitudes towards LMS

vendor support between the US and the UK as possible reasons. Caldwell (2007, p. 18), meanwhile, suggests that a delay in UK adoption is inevitable as the market leaders were developed overseas.

Adamson et al. (2008, pp. 9, 17) are critical of open source LMSs, claiming that the staff and support overheads for such systems are unworkable and that American experience indicates that OSS does not mean cheaper or more interoperable LMSs. Adamson et al. (2008, p. 22) also question the benefit in adopting open source LMSs based on "established processes", though do advocate moving towards OSS components as building blocks for a LMS (2008, pp. 22, 31). Differences with other countries are noted in this study, which concedes that open source LMSs have "made progress" outside the UK (2008, p. 71).

Tennant (2008) regarded Adamson et al. as being "dismissive of open source systems", possibly indicating a "dramatically different situation in the UK" to the US.

2.6 Summary

Considering the synergy between libraries and the open source movement, adoption of open source LMSs has been slow, particularly in the UK. The literature suggests a variety of reasons for this, including barriers caused by procurement procedures, issues with functionality and stability, the technical ability required to modify source code and concerns over forking and poor documentation.

Several drivers towards open source library systems are also evident, such as strategic moves towards collaboration and shared services promoting greater interoperability and consortia, the development of SaaS, and the suggestion of a community source model based on Kuali OLE in the SCONUL HEFCE Shared Services Study (Sero Consulting Ltd., 2009).

No respondents surveyed in Adamson et al. (2008) thought it likely they would adopt an open source LMS, and little research has been conducted into attitudes towards such systems within UK higher education libraries. This research will shed light on whether opinion has changed in the last three years, explore the reasons behind the lack of adoption within the sector and investigate whether drivers towards interoperability, cloud computing and community models will increase the uptake of these systems.

3. Methodology

3.1 Introduction

An overview of the research design is provided in this chapter, which describes the methods used and reasons for adopting them, and outlines data analysis procedures. This chapter also examines the ethical issues taken into consideration and the limitations of the study.

3.2 Research strategy

A quantitative approach may be used to identify whether libraries are considering open source LMSs, as seen in the surveys of Adamson et al. (2008) and Breeding (2010). The results of such studies may vary with time, however, as libraries and LMSs develop. A qualitative approach may help identify the drivers behind institutions' attitudes to open source LMSs and whether these are likely to change, indicating whether these systems will become more widely adopted in the future.

A combined quantitative and qualitative approach was therefore chosen, with quantitative data being sought to provide a broad picture of current attitudes towards open source LMSs in UK higher education followed by a qualitative study to explore the reasoning behind individual views. Mixed methods research beginning with a quantitative study and using this to inform a subsequent qualitative enquiry is described by Creswell (2009, p. 211) as a sequential explanatory design.

Mixed methods research has been criticised by Smith and Heshusius (as cited by Bryman, 2008, p. 604), for ignoring differences in the "assumptions underlying research methods". Bryman counters this argument, however: "the idea that research methods carry with them fixed epistemological and ontological implications is very difficult to sustain" (2008, p. 604). Creswell (2009, p. 203) believes mixed methods research is a "step forward, utilizing the strengths of both qualitative and quantitative research"; the intention with this study. By using mixed methods, triangulation can also be conducted to allow verification through comparison (Bryman, 2008, p. 379).

3.3 Research design

The research is of a cross sectional design, collecting data from multiple institutions at a single point in time (Bryman, 2008, p. 44). A longitudinal design element was also included through a comparison with Adamson et al. (2008).

This design was chosen as the most suitable for answering the research question. While a case study would give a detailed account of a single case, such as Bissels (2008), this would not examine attitudes across the sector. The same restriction applies to comparative design, which would only give an account of two contrasting cases. Experimental design would involve manipulation of a variable (Bryman, 2008, p. 35), unfeasible in the study of external institutions on which the author has no influence.

3.4 Research methods

To identify suitable research methods, similar studies were analysed (Appendix B). All those of a social sciences orientation used a questionnaire, the majority of which were conducted online. Adamson et al. (2008) also used focus groups and interviews. Focus groups were not considered suitable due to the geographical spread of institutions and the difficulty of getting together members of the survey population simultaneously. A quantitative online questionnaire and qualitative interviews were therefore selected.

3.5 Questionnaire

Bourque and Fielder (2003, pp. 9-15) cite several advantages to questionnaires applicable to this research: they are a low cost method of researching a population covering a large geographical area without additional personnel. Timing issues can also be partially eliminated since "all members of the sample receive [the questionnaire] nearly simultaneously" (Bourque & Fielder, 2003, p. 13).

3.5.1 Online versus print

The questionnaire was conducted online to save the time and cost of printing and distribution. E-mail addresses for targeted staff were also more accessible than postal addresses on many institutional websites. Online questionnaires allow data to be compiled automatically, and can restrict respondents to selecting predetermined answers to aid the coding process (Bourque & Fielder, 2003, pp. 12-13).

While respondents must be computer literate (Fink, 2003d, p. 104), this was not a concern given the survey population of information professionals with responsibility for library systems.

3.5.2 Population

The UCAS list of universities and colleges (UCAS, n.d.) and the Wikipedia entry for UK universities ("List of universities in the United Kingdom," n.d.) were used to gather a list of institutions for surveying; 245 were found to be teaching at higher education level including some privately funded.

Each institution's website was examined for appropriate contact details. To ensure the highest possible response rate, sending the survey to a relevant, current contact was considered crucial, and to ensure maximum validity it was desirable that each contact be employed in a similar role. The following were identified in order of preference:

1. Library-specific systems manager or administrator;
2. Electronic resources manager or administrator;
3. Head of library services;
4. Library helpdesk or administrator.

An email requesting contact details was sent to institutions with no library information on their website. 6 emails were returned due to incorrect addresses and 6 institutions confirmed that they did not have a library service; these were removed from the list of participants. The 52 institutions which did not respond, mainly privately funded, were also removed from the list to avoid responses from staff without an understanding of their library.

Some institutions in the list are partners or affiliates. These were treated as separate institutions since many have separate LMSs; for example at the University of London, Birkbeck use Horizon while St George's use Unicorn (Adamson et al, 2008, p. 149).

This left a total of 181 contacts for the survey. Given the relatively small population all were surveyed, eliminating the need for sampling and therefore possible sampling error.

3.5.3 Pilot

Fink recommends the use of a pilot to "monitor the ease with which respondents complete the questionnaire and... with which you can administer and score the instrument" (2003b, p. 108). A pilot was conducted in November 2010 with 4 participants, 3 from different UK higher education institutions working with LMS administration in their professional role. All were known to the author and were selected to provide detailed, reliable feedback.

3.5.4 Software

Esurveyspro (2010) and Survey Monkey (2010) were identified as cost-effective online survey tools. Esurveyspro was used for the pilot questionnaire; respondents were found to be unable to skip questions of no relevance using this tool, however, leading to inaccurate results. To rectify this, the final questionnaire was hosted in Survey Monkey which permitted the use of survey logic, allowing certain questions to be hidden depending on previous answers.

3.5.5 Questionnaire design

A copy of the final questionnaire can be found in Appendix C. A funnelling technique (Barnes, 2001) was used with general questions being asked first, gradually leading to focussed questions relating to open source LMSs. Following guidance from Bourque and Fielder (2003, p. 62) the only demographic question, about the size of the respondent's library service, was placed at the end of the questionnaire.

Bourque and Fielder (2003, pp. 36-37) advocate using existing questions to allow comparison with other studies. Permission was granted to use three questions from Adamson et al. (2008) by David Kay of Sero Consulting (Appendix D) to indicate whether attitudes towards open source LMSs have shifted over the last three years.

As the questionnaire was intended as a quantitative instrument, closed-ended questions were mainly used, aiding data ranking (Fink, 2003d, p. 38). Bryman (2008, p. 221) also believes "postal questionnaires should comprise as few open questions as possible, since people are often deterred by the prospect of having to write a lot", and it was thought this also likely to apply to online surveys.

Due to the nature of the topic, use of technical terminology was unavoidable. Terms such as “open source software” may induce emotional feelings depending on participants’ beliefs and experiences. Hyperlinks to Google Definitions (*Google*, n.d.) and Wikipedia (n.d.) were used to provide definitions of key terms with no positive or negative associations, as recommended by Bourque and Fielder (2003, p. 55). Despite the inclusion of definitions, it may not be possible or even desirable to reduce emotional responses to such terms as this could have an effect on survey responses. The study took a constructivist ontological position (Bryman, 2008, p. 19) and sought to minimise researcher influence on the meaning of key terms in the questionnaire.

A Likert scale was used in several questions to capture respondents’ attitudes. Balanced, five point scales were used where possible (Fink, 2003d, pp. 56-57), with neutral centre options included to provide an unbiased choice for those with little experience of the topic. The three questions taken from Adamson et al. (2008) were not balanced, but were left unchanged to increase the validity of the comparison between the two questionnaires. Question 24 used an equal number of intermingled negative and positive statements to prevent respondents from producing a biased result when selecting the same answer for each, and to help identify answers exhibiting “response sets” (Bryman, 2008, p. 147).

3.5.6 Response rate

The response rate to a survey is crucial to its validity; a low response rate introduces errors caused by non-response bias (Bryman, 2008, p. 180). This presented a challenge to the research, since “online survey response rates appear to fall well below those of mail surveys” (Bourque and Fielder, 2003, p. 17). While Mangione’s (as cited in Bryman, 2008, p. 219) classification of response rates lists those under 50% as “not acceptable”, Bourque and Fielder believe “response rates in the range of 10% to 20% are common for online surveys” (2003, p. 17). Barnes (2001) also claims that receiving “30-35% of questionnaires back from an unsolicited survey” is considered good.

Adamson et al. (2008) can be considered a benchmark for this research as a survey about LMSs conducted online among UK higher education institutions. This survey received 100 responses, though the response rate is unknown as the total surveyed is not given.

Guidance by Bourque and Fielder (2003, p. 130) and O'Neil (2008) was followed in the construction of an email invitation (Appendix E) to encourage response. Two reminder emails were sent at 10 day intervals as advocated by Fink (2003a, p. 58) aimed at increasing the response rate. Invitation emails were sent out mid-week as recommended by Lemon (2007).

3.5.7 Data handling

Results from Survey Monkey (Appendix F) were exported in text format and imported into SPSS for analysis using a codebook (Appendix G). SPSS data was exported to Microsoft Excel for tables and graphs to be produced. Qualitative comments from question 26 were exported and analysed with the interviews in a separate spreadsheet (Appendix H). All data processing was done by the author to prevent inter-coder error.

3.6 Interviews

Five interviews were held between April and June 2011, varying in length from just over fifteen minutes to forty minutes, with most taking approximately thirty minutes.

3.6.1 Sampling

A purposive sample was used to ensure variety (Bryman, 2008, p. 415). As advised by Creswell (2009, p. 178) participants "that will best help the researcher understand the problem" were selected. The 16 questionnaire respondents willing to be interviewed were allocated a score based on their responses to three questions: 16 "Which statement best describes your personal attitude to open source software", 18 "How likely is it that your institution will adopt an open source LMS in the future", and 19 "Which statement best describes your institution's current involvement with open source LMS". The lowest scores are likely to represent candidates or institutions with a positive opinion of OSS and the highest those with a negative opinion. The respondents with the highest and lowest scores were chosen alongside three other respondents from across the range of results, taking into account the number of staff in their library and the history of their institution. Of the five participants originally selected, four were successfully interviewed and one could not be contacted. The fifth interview was therefore held with a reserve participant receiving an identical score.

3.6.2 Interview design

The protocol described by Creswell (2009, p. 183) was used as a template for the interviews, which began with an ice-breaker followed by the main questions and closed by thanking the participant. Interviews were semi-structured, with a schedule (Appendix I) being used. Some questions were omitted depending on participants' previous responses and additional probing questions were asked where useful.

Interviews were conducted by telephone. This method does have disadvantages, notably the inability to observe body language and potential recording difficulties (Bryman, 2008, p. 457); rapport may also "be more difficult to achieve" (Robson, 2002, p. 282). These issues were not considered significant given the intention to seek factual information rather than an emotional response. Telephone interviews can be "regarded as highly efficient" in saving time and travel costs (Bryman, 2008, p. 458), and were considered preferable to in-person interviews due to the geographical distribution of interviewees and the limited time available. There is also evidence of "smaller interviewer effects and a lower tendency towards socially desirable responses" in telephone interviews compared to in-person interviews (Bradburn & Sudman, as cited in Robson, 2002, p. 282).

Recording interviews is advocated by Bryman (2008, p. 451) and was considered crucial due to the author's lack of experience, allowing accurate transcripts to be prepared and prevent important details from being missed. Interviews were recorded with a speakerphone and digital voice recorder.

3.6.3 Pilot

A pilot interview was conducted in April 2011, and as a result one question was removed which was not clearly understood and did not lead to useful discussion. Problems with the quality of the recording due to a poor analogue telephone signal were also identified. The final interviews were therefore conducted in a different location with a digital telephone system.

3.6.4 Data handling

Interviews were transcribed into Microsoft Word and analysed for key themes identified during the literature review and survey, using a coded spreadsheet (Appendix H). Additional

themes discovered during transcription were added to the spreadsheet during analysis. All coding was done by the author, preventing inter-coder error. Two sample interview transcripts are provided in Appendix J.

3.7 Ethics

Milligan et al. (n.d.) identify six core issues for ethical social research: "anonymity and confidentiality, informed consent..., professional integrity, legitimacy of the data, data security and safety and risk".

While the survey could be completed anonymously, respondents were invited to provide their email address if willing to be interviewed or requesting a copy of the results. This offered participants feedback on findings, as advised by the British Sociological Association (2002). Guidance was given in the introduction about the usage of personal data supplied. The contact details of those who wanted a copy of the findings were removed from the results prior to analysis and converted into a mailing list, held on a password protected server. As it was intended to interview people with a range of views, contact details of those willing to be interviewed remained in the results until analysis was complete, stored in password protected files.

To ensure confidentiality, recipients' email addresses were entered in the BCC field of the invitation email, as recommended by O'Neil (2008).

An invitation containing an informed consent form was sent to interviewees (see Appendix K), following guidance by Creswell (2009, p. 89) and Bryman (2008, p. 123), also seeking permission for audio recording. Interviewees were given the option to remain anonymous, and permission was sought for transcriptions to appear in the dissertation. Each interviewee was offered a copy of their transcript for review, though all declined.

The purpose of the study was stated in the email invitation, as recommended by Creswell (2009, p. 88) to avoid deception, and was also repeated at the top of the questionnaire.

Neuman (as cited in Creswell, 2009, p. 92) advises that research is released with details of the study design in order for readers to make their own decision about credibility. The design is described in this chapter which will also aid replication, one of the criteria specified by Bryman (2008, p. 31) for evaluation of social research.

All data was dealt with in accordance with the Data Protection Act 1998. Results were stored on a password-protected website for the duration of the survey, and then downloaded to personal hard disk following its completion with backups made to flash memory. Audio recordings were stored on password-protected hard disk. All files were password-protected, and online results were subsequently deleted.

3.8 Limitations

There are several limitations to the research which may affect the validity of the findings.

3.8.1 Questionnaire

Bourque and Fielder (2003, p. 16) note that, with online surveys, "if access to the site is not controlled... any individual who learns of or happens across the site can complete the survey". As invitations were sent only to potential participants, and the URL was not publicised, this was not of great concern.

Of more importance is potential non-response bias. The 58 institutions whose library service could not be contacted did not receive the invitation. This represents a sizeable portion of the total population (23.7%). Invitation recipients with strong feelings towards open source may have been more likely to complete the questionnaire, leading to "differences between participants and refusals" affecting results (Bryman, 2008, p. 219). Criticism levelled at Breeding's (2010) survey by Scott (2010), who claims that respondents number a small proportion of the libraries in the country, are self-selected and "therefore more likely to either have an axe to grind or a selection decision to defend", could also apply to this study.

Another limitation is item non-response, "when a respondent... does not complete all items on a survey form" (Fink, 2003a, p. 57). Making questions compulsory could have eliminated item non-response but may have increased survey non-response; Fink (2003d, p. 113) notes that respondents may have "legitimate reasons" for omitting questions, and may even "be unable to provide the answers" leading to frustration and causing respondents to quit before completing the survey. As a high overall response rate was important, all questions were left optional.

Although IP address recognition prevented respondents from completing the survey more than once on the same computer, it is possible that respondents have entered multiple replies using different computers.

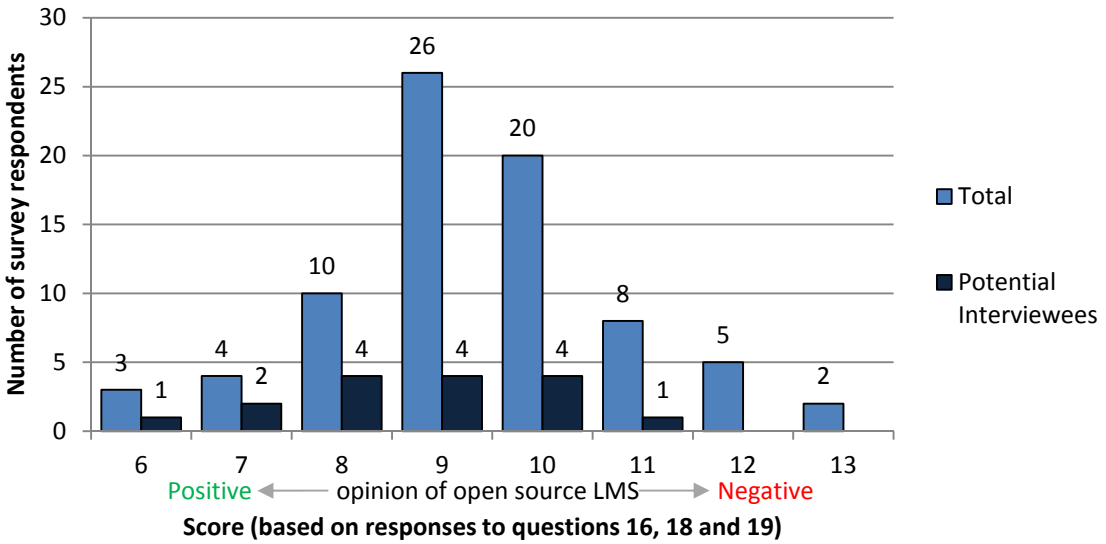
Despite the replication of the three questions from Adamson et al. (2008) respondents may not be from the same institutions, limiting validity in comparisons between the two surveys, especially given the response rate of 50% or below in both. Since Adamson et al. conducted a wider survey about LMSs, it is also possible that the author's study attracted a larger proportion of respondents with an interest in OSS.

Although particular care was taken to portray a neutral opinion towards OSS throughout the questionnaire, it is evident in retrospect that there is no negative equivalent to question 25, which cites advantages to open source LMSs. It is possible this led to participants with less favourable opinions towards OSS viewing the survey in a negative light, and exiting prior to completion, leading to bias in the results.

3.8.2 Interviews

Despite the care taken to select a range of interviewees, it is notable that no respondents with the two highest scores agreed to participate (see Figure 1). This suggests a bias towards those who favour OSS. The interviews with lower scoring participants, i.e. those likely to have a more positive opinion of open source, generally lasted longer than interviews with higher scoring participants. The shortest interview was with the candidate

Figure 1: Scores calculated to aid selection of interviewees



with the highest score. Those enthusiastic about OSS seemed more willing to provide detailed answers.

3.9 Summary

The combined quantitative and qualitative approach enabled collection of data to address the research question. An online questionnaire based on issues gathered during the literature review sought a broad overview of attitudes to open source LMSs, and subsequent interviews allowed for these to be explored in detail. Although the overall response rate was reasonable for an unsolicited online survey, issues of non-response bias may affect the validity of questionnaire findings. There may also be an unintentional bias in favour of open source LMSs in interview results, as participants advocating open source software seemed more willing to participate and provide detailed answers.

4. Results

This chapter presents results from the questionnaire and interviews.

4.1 Online questionnaire

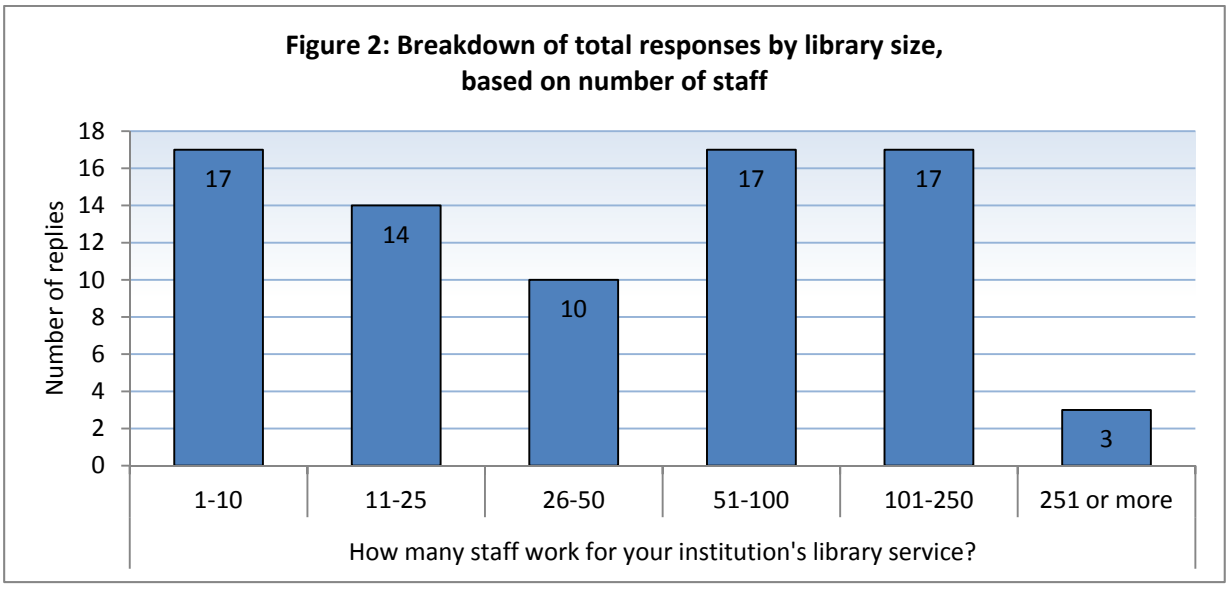
4.1.1 Response rate

84 questionnaire replies were received which, out of 181 invitations, equates to a response rate of 46.4%. Of these, 75 were complete and 9 partially complete; percentages in the following results therefore refer to the proportion of replies to each individual question. Following the invitation 70 responses were received, with 2 reminders resulting in a further 14 replies. Figures not stated as percentages in the results which follow refer to the actual number of answers.

If the total population is considered to be 245 institutions, and each response is taken to be from a different institution, 34% of the population completed the survey. If respondents had been selected through probability sampling, this would result in a confidence interval of 8.69 at a confidence level of 95%. As respondents were effectively self-selected, this confidence interval is of limited value.

Participants were asked to specify the number of staff in their library to indicate the size of their institution. As Figure 2 shows, responses were received from staff in a range of different sized libraries, though notably less from those with more than 250 staff.

Figure 2: Breakdown of total responses by library size, based on number of staff



4.1.2 Current LMS

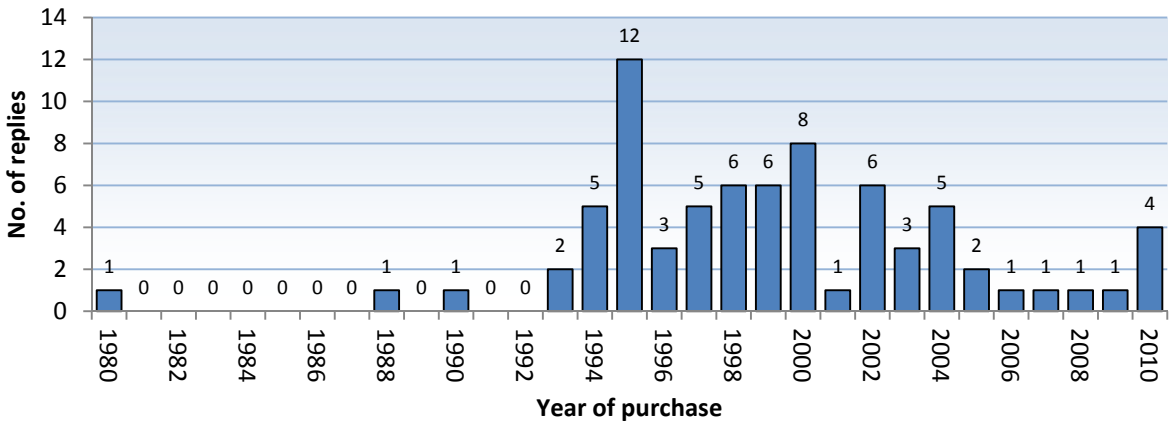
Respondents were asked which LMS supplier they used; the top four were identical to Adamson et al. (2008) aiding external validity. 82% of respondents used these suppliers (see Table 1), which compares with 87% in Adamson et al. (2008).

	Frequency	Percent	Adamson et al. %
Talis	22	26.2%	22.8%
SirsiDynix	21	25.0%	22.8%
Innovative	16	19.0%	17.9%
Ex Libris	10	11.9%	23.4%
IS Oxford	6	7.1%	3.3%
OCLC	3	3.6%	1.6%
Softlink	3	3.6%	0.5%
Infor	2	2.4%	1.6%
Other	1	1.2%	6.1%

Table 1: Current LMS suppliers

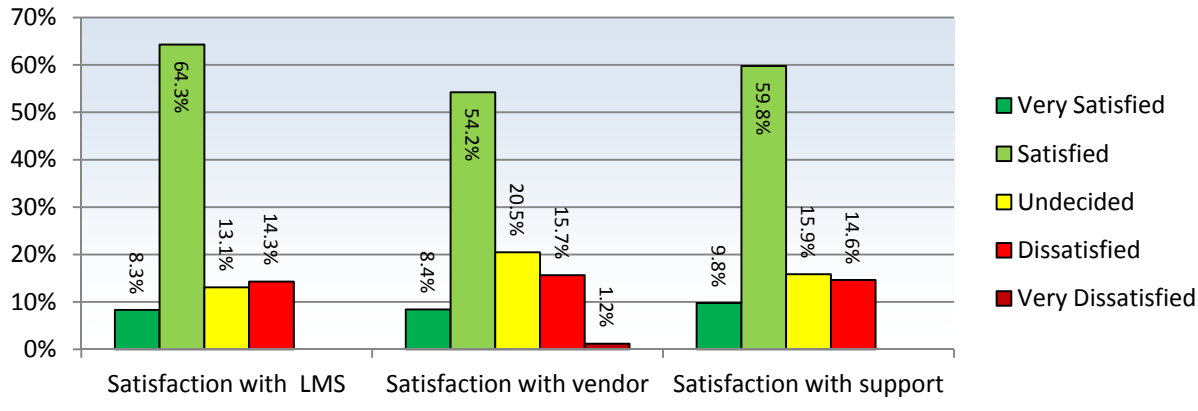
A majority of respondents purchased their LMS between 1993 and 2000 as shown in Figure 3. Purchases declined throughout the 2000s until 2010.

Figure 3: Year of LMS Purchase



Most respondents were satisfied with their current LMS, vendor and support (Figure 4).

Figure 4: Satisfaction with current LMS, vendor and support



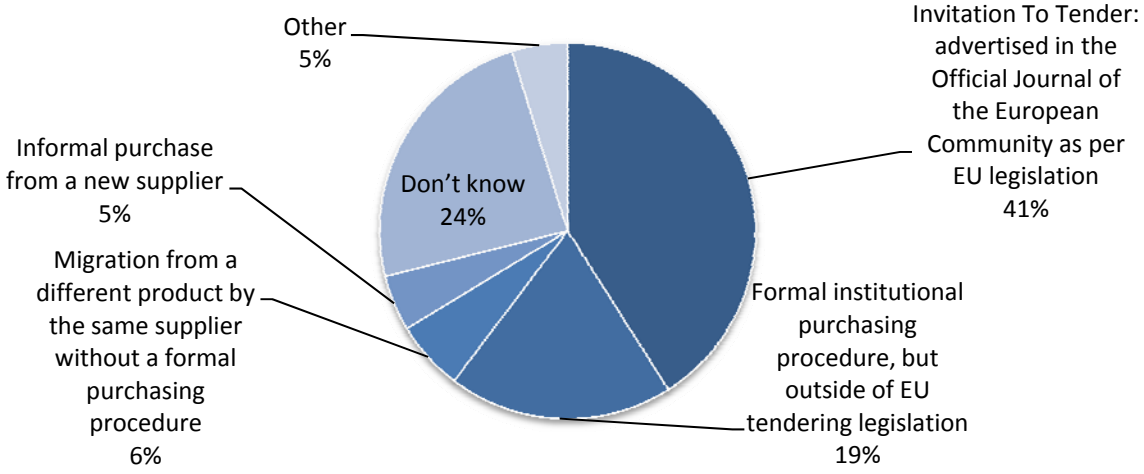
Most LMS servers are hosted in the I.T. department (54 replies, or 64%); 16 (19%) are hosted within respondents' libraries, 10 are hosted by other institutions, and 4 elsewhere. None are vendor-hosted in a Software-as-a-Service arrangement.

67 respondents' LMSs are being regularly updated, 13 have only bug fixes or minor updates being released and 1 is no longer being upgraded. 58 respondents have no current plans to change their LMS; of the remainder, 4 intend to change between August 2011 and July 2012, 3 between August 2012 and July 2013, and 9 between August 2013 and July 2014.

4.1.3 Purchasing and selection

A formal purchasing procedure was followed by 60% of respondents when selecting their current LMS (see Figure 5).

Figure 5: Purchasing processes followed when acquiring current LMS



78 of respondents' (92%) libraries were involved in the LMS selection process. Of the remaining 6, 4 did not know who was involved. Respondents were able to select multiple answers; a breakdown is shown in Table 2.

63 respondents (75%) indicated that they are not consortium members; of the 21 (25%) who are, 10 share a LMS.

Department	Frequency	Percent
Library	78	91.7%
IT	29	34.5%
Senior Management	16	17.9%
Finance / Procurement	11	13.1%
Partner Institution	1	1.2%
Library User Committee	1	1.2%
Hosting Institution	1	1.2%
Education Department	1	1.2%
Academics	1	1.2%

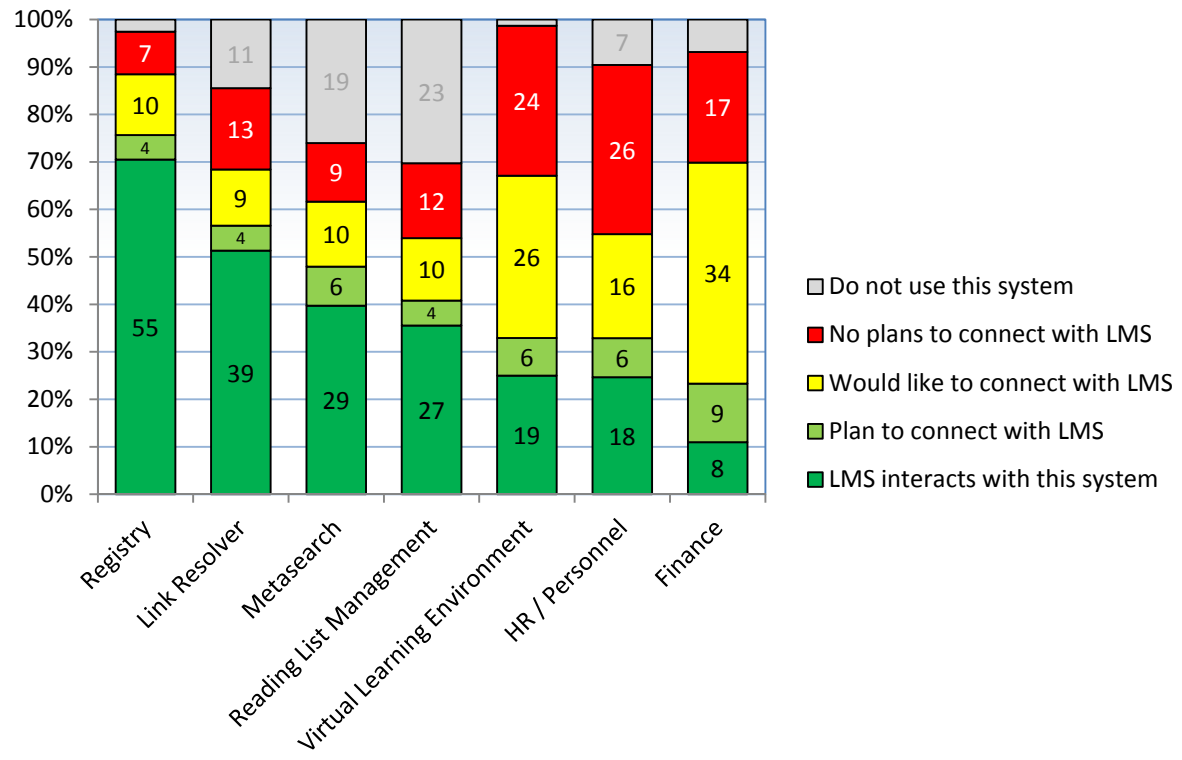
Table 2: Departments involved in LMS selection

54 respondents (68%) were interested in the "e-Content Licensing Scheme integrated with a total Library Management and Services Platform" advocated by the SCONUL HEFCE Shared Services Study (Sero Consulting Ltd., 2009) and will be monitoring developments, while 12 (15%) would actively consider adopting such a system. Only 3 (4%) were not interested.

4.1.4 Interoperability

The Registry system was the most common institutional system to interact with respondents' LMSs, as shown in Figure 6. The least was the Finance system, though this is the system most respondents would like to connect with their LMS (34, or 47%).

Figure 6: LMS interaction with other institutional systems



41 respondents (51%) use an API with their LMS, 27 (34%) do not, and the remainder were unsure. Reasons for not using an API are shown in Table 3; respondents could select multiple answers.

Reason	Frequency
Don't know what an API does	8
No current need	7
Lack of technical knowledge	6
Licence is too expensive	5
Not available with current LMS	3
Other	2

Table 3: Reasons for not using an API

4.1.5 Open source

55 respondents (69%) currently use open source software in their library. More respondents reported preferring commercial software (14) than open source (9), though most (55) consider open source and commercial software equally.

67 respondents (84%) were aware of open source LMSs, though only 21 (26%) have ever used one. Of those who have, most reported that the experience has not changed their opinion about adopting one, as shown in Table 4.

Answer	Frequency	Percent
Much more likely to consider open source LMS	1	4.8%
Slightly more likely to consider open source LMS	6	28.6%
It has made no difference	9	42.9%
Slightly less likely to consider open source LMS	5	23.8%
Much less likely to consider open source LMS	0	0.0%

Table 4: How personal experience of open source LMS has influenced opinion

52.5% of respondents (42) thought their institution may adopt an open source LMS in the future; this compares to 39.1% in Adamson et al. (2008) as shown in Figure 7. Results were further analysed by the number of staff in respondents' libraries (Figure 8). Of interest is the comparatively high number (11) of respondents from libraries with under 10 staff who thought it unlikely that they would adopt an open source LMS.

Figure 7: Likelihood of open source LMS adoption

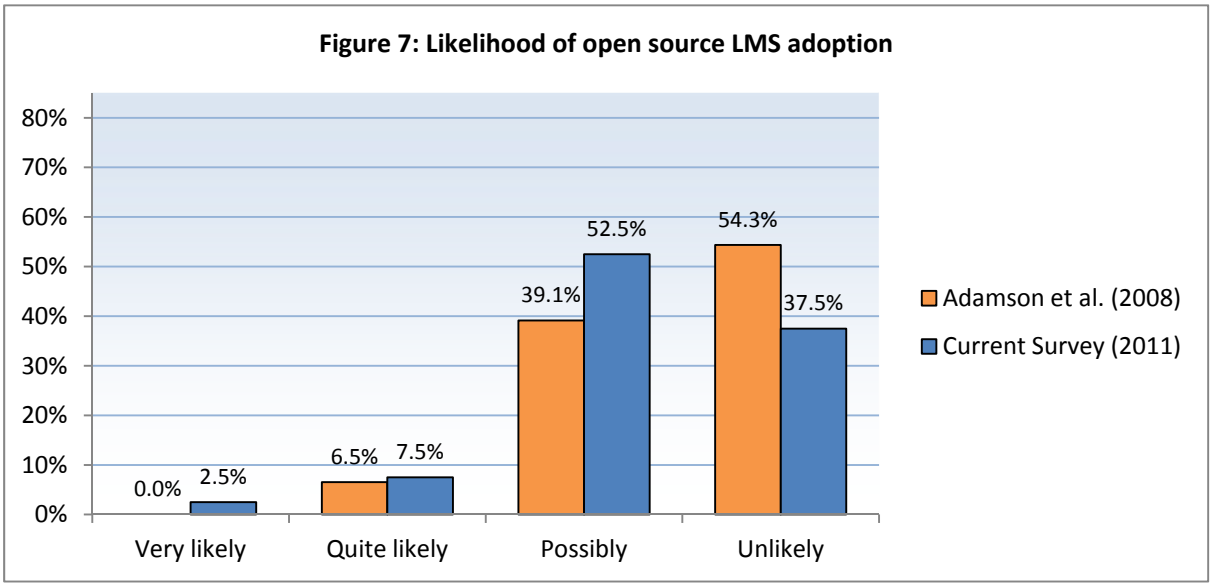
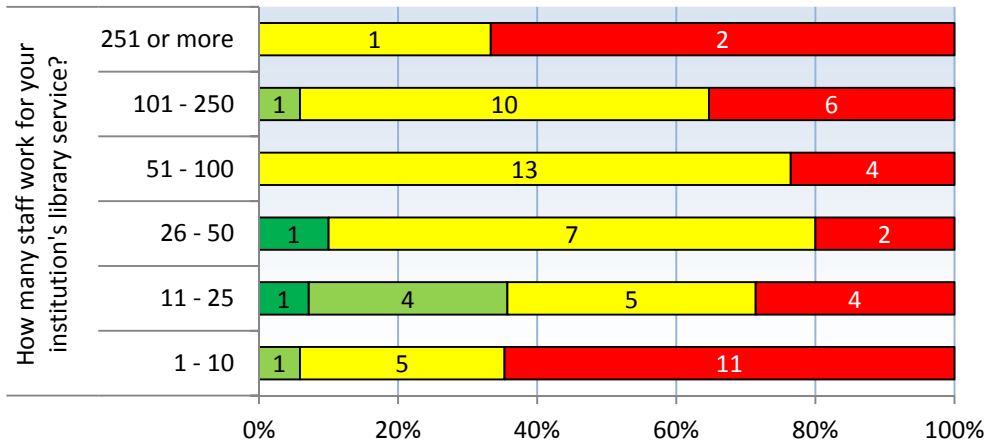
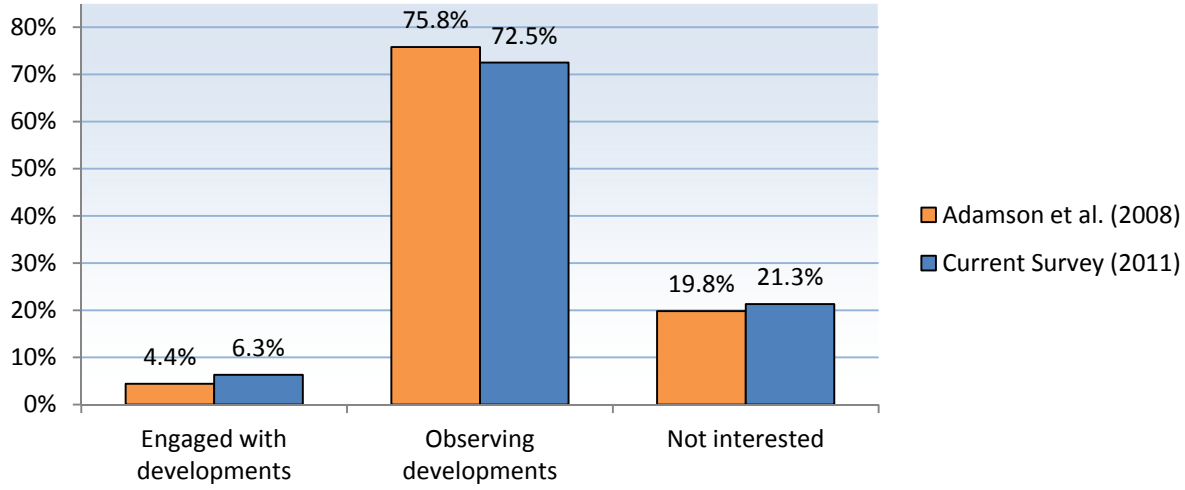


Figure 8: Likelihood of adopting open source LMS, by size of institutional library service



73% of respondents (58) are observing open source LMS developments, compared with 76% in Adamson et al. (2008). While the 6% reporting to be engaged with developments is higher than the 4% in Adamson et al. (2008), a slightly higher number (21%) also reported not to be interested in open source LMS, as shown in Figure 9.

Figure 9: Involvement and interest in open source LMS



48 respondents (61%) believe support from a third-party company could encourage them to move to an open source LMS, while only 26 (33%) believe third-party hosting would encourage such a move, as shown in Figure 10. Responses were further analysed by the number of staff in respondents' libraries. While third-party support seems less likely to encourage respondents in libraries with fewer than 10 staff to adopt an open source LMS (Figure 11), no such trend appears evident with third-party hosting, as Figure 12 illustrates.

Figure 10: Responses to "Would support or hosting (SaaS) from a third party company encourage your library to move to an open source LMS?"

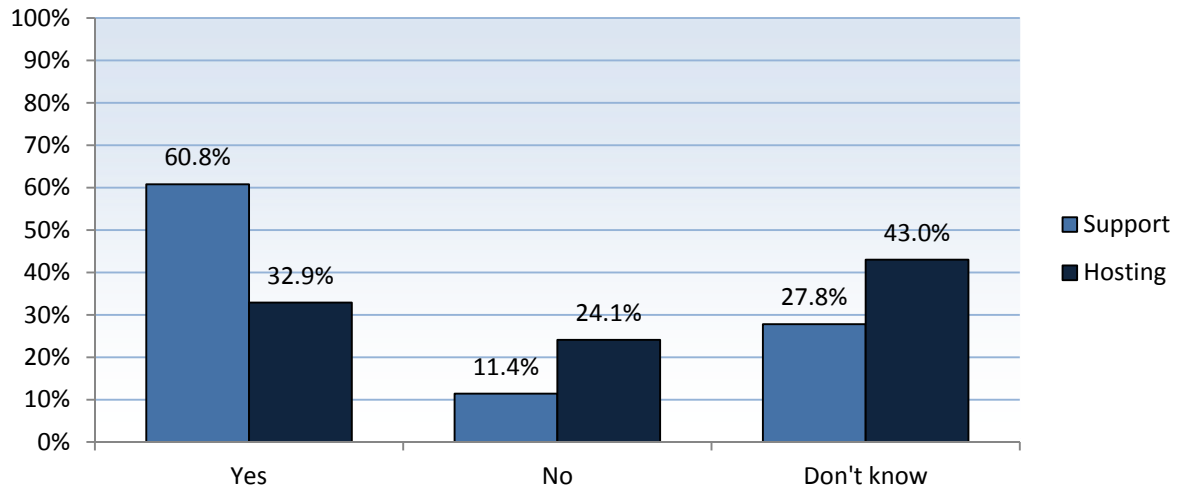


Figure 11: Responses to "Would support from a third party company encourage your library to move to a open source LMS?" by library size

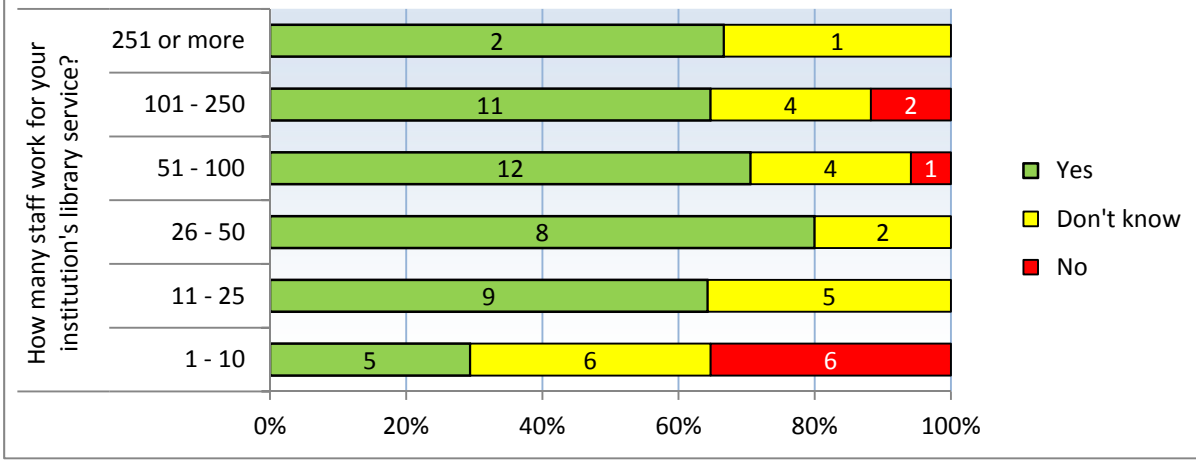
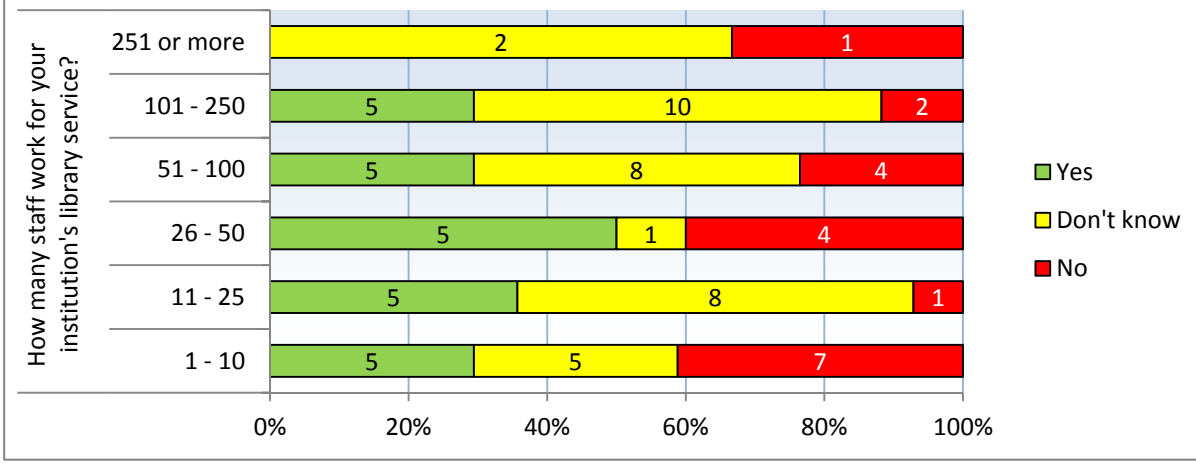


Figure 12: Responses to "Would hosting from a third party company encourage your library to move to a open source LMS?"by library size



Participants were asked for their views towards key issues surrounding open source LMSs. More than half (54%) agreed or strongly agreed that their institution lacked the staffing to support open source LMSs (Figure 13). Responses were further analysed by the number of staff in respondents' libraries; Figure 14 illustrates no clear trend for any size of library to be more likely to agree.

42% disagreed or strongly disagreed that the reputation of open source LMSs is as high as that of commercial equivalents. Only 17% agreed with this statement.

Figure 13: Attitudes towards key issues surrounding open source LMS

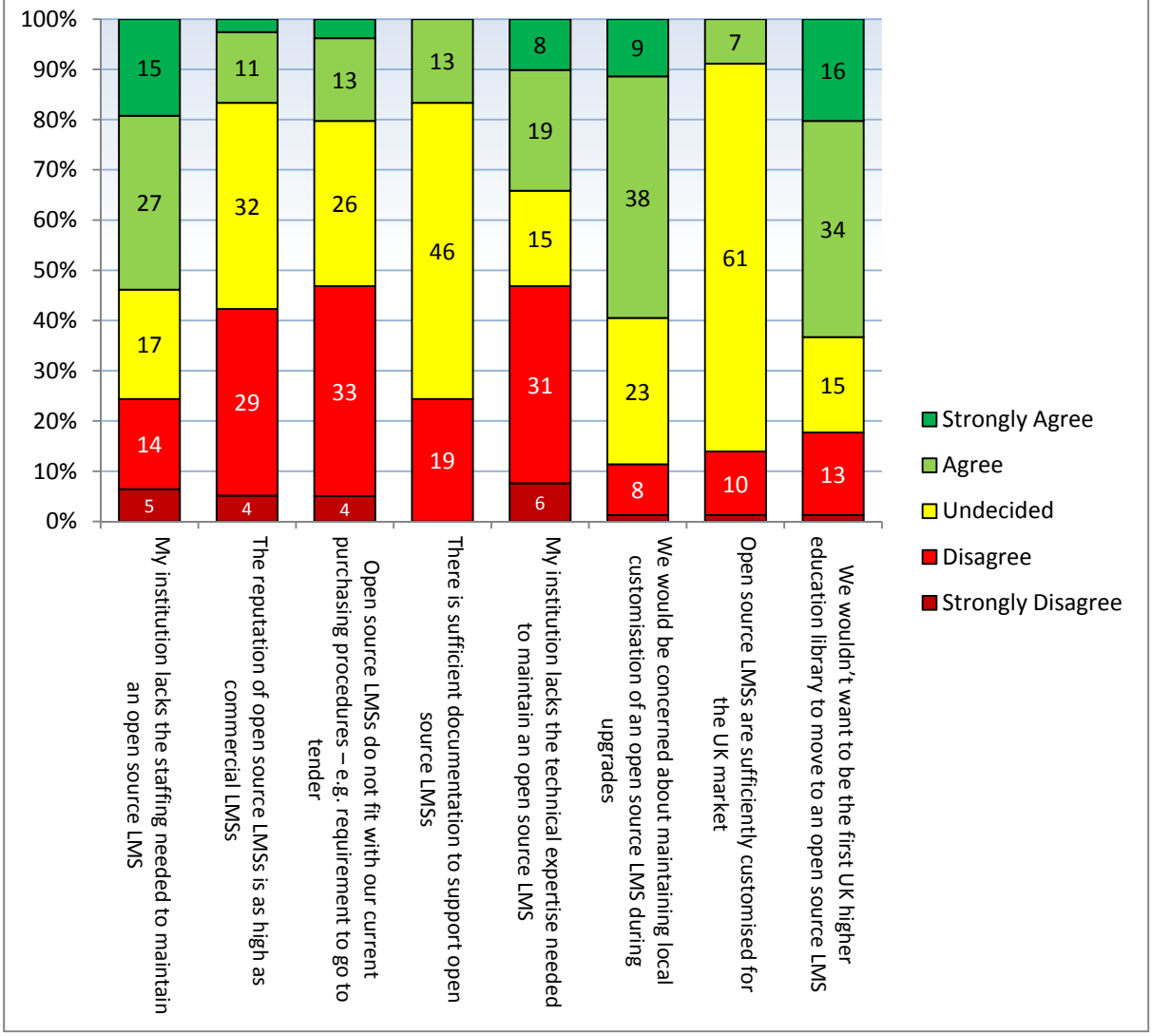
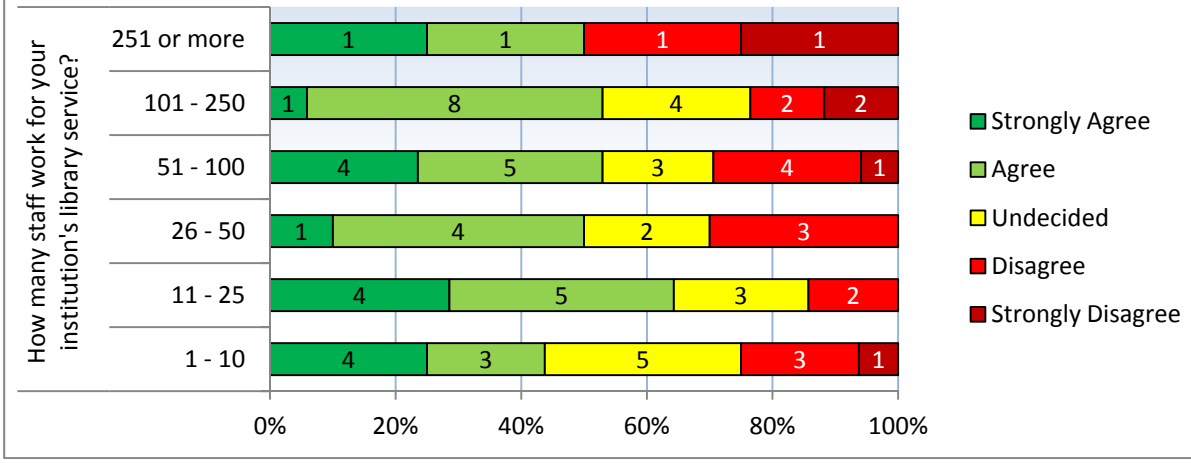
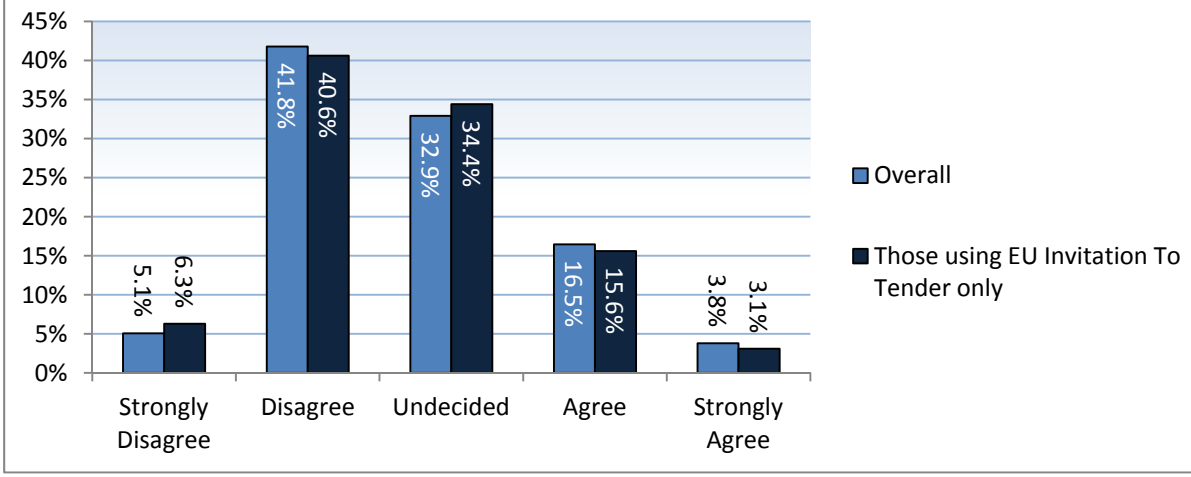


Figure 14: Responses to "My institution lacks the staffing to maintain an open source LMS" by library size



47% disagreed or strongly disagreed that open source LMSs did not fit with their current institutional purchasing procedures. Results were further analysed by libraries following E.U. Invitation to Tender procedures, with little difference in the breakdown of results (Figure 15), suggesting procurement processes may not be a barrier to open source LMS adoption.

Figure 15: Responses to "Open source LMSs do not fit with our current purchasing procedures" by libraries using E.U. Invitation to Tender



No respondents strongly agreed or strongly disagreed that there is sufficient documentation to support open source LMSs. A majority (59%) were undecided, suggesting many may be unsure of the quality of documentation available.

47% disagreed or strongly disagreed that their institution lacked the technical expertise to maintain an open source LMS.

A majority of respondents (60%) were concerned about maintaining local customisation of an open source LMS during upgrades, and a majority (77%) were undecided as to whether open source LMSs are sufficiently customised for the UK market.

Most respondents (63%) agreed that they wouldn't want to be the first UK higher education library to adopt an open source LMS.

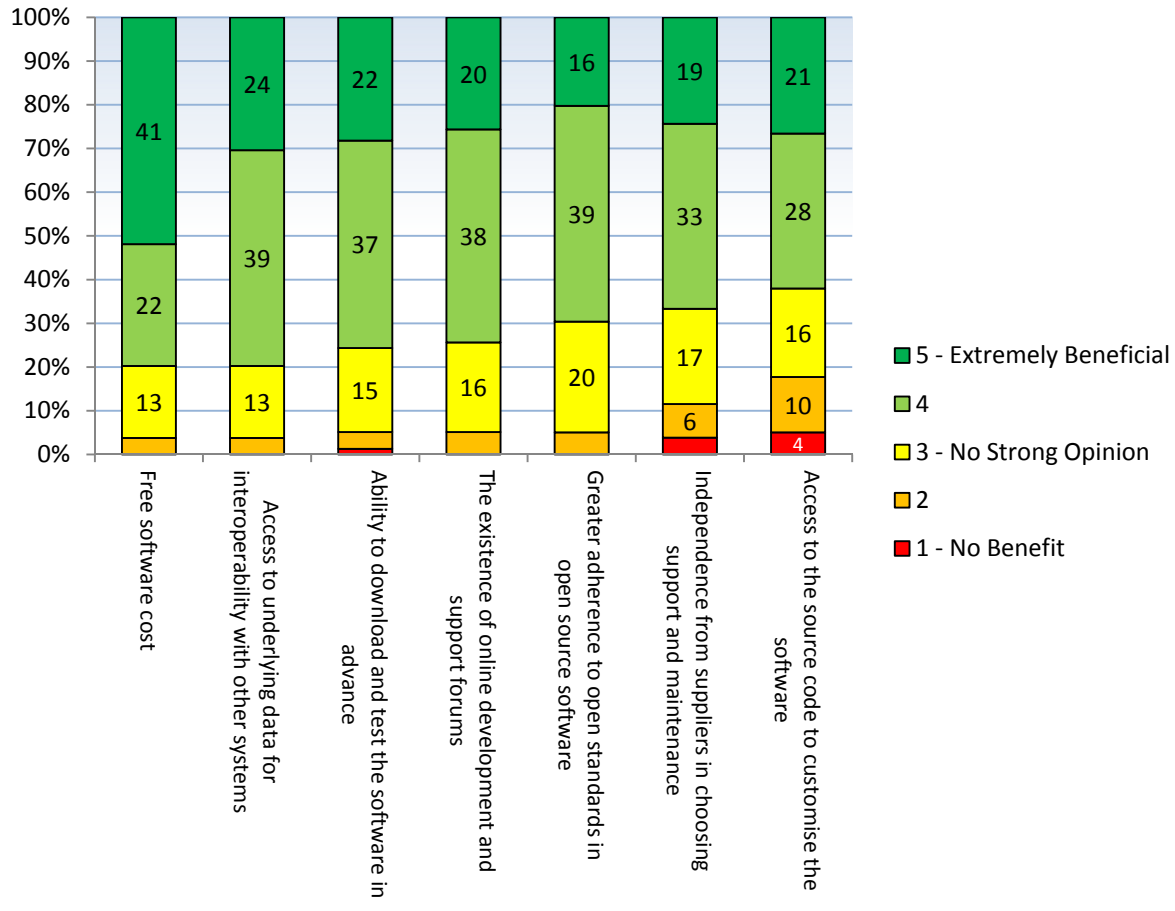
Respondents were asked to score how beneficial some commonly cited advantages of open source software would be, applied to a LMS, as illustrated in Figure 16. Free software cost was seen as most beneficial, with 41 respondents rating it the maximum score. Access to underlying data to improve interoperability was also considered beneficial with only 3 respondents rating this advantage the lowest two scores, though only 24 respondents rated the maximum score. The ability to download and test OSS and the existence of online development and support forums received very similar results.

The greater adherence to open standards in OSS was considered beneficial by a majority of respondents, though received the least number of maximum scores (16), and the highest number of "no strong opinion" scores, suggesting many are undecided as to how valuable this actually is.

Independence from suppliers for selecting support and maintenance was given 19 maximum scores, though 3 respondents also rated this of no benefit.

Access to the source code to customise the software received the most number of "no benefit" scores (4), though these still represent a small minority of results. A relatively high number of respondents (21) believed this was extremely beneficial, however, and only 16 had no strong opinion, suggesting respondents have stronger views about this perceived advantage.

Figure 16: Attitudes towards commonly cited advantages to open source software, applied to LMSs



4.2 Interviews

The interviews were analysed thematically together with qualitative comments from the questionnaire (Appendix H). The semi-structured nature of the interviews allowed separate questions to cover themes identified from the literature review, aiding this process. Additional themes were identified based on topics covered in detail by one or more participant. Results shown below are discussed thematically.

4.2.1 Interviewees' experience

Interviewees were asked when and where they first heard about open source LMSs. The wide spread of answers given suggests a range of participants with different experience. Two interviewees had first heard of open source LMSs in the last year, one interviewee five or six years ago, and the remainder in between. None had heard about open source LMSs from the same source; responses were from doing research, the library press and dealing with a support company.

Participants were most familiar with Koha; three had tested it, and the remaining two had been to a demonstration. Koha was referred to when participants gave examples, which may not be reflective of other open source LMSs. As only 26% of questionnaire respondents had experience of an open source LMS, interviewees are more likely to be knowledgeable about the topic than the population as a whole.

4.2.2 Comparison with proprietary LMSs

Interviewees were asked how they felt open source LMSs compared to proprietary systems. Results were well aligned with interviewees' scores (see 3.6.1), suggesting good internal validity. For example interviewee 1, the participant with the lowest score, gave the most negative opinion, stating that open source LMSs were "nowhere near as sophisticated" as proprietary LMSs.

Several interviewees expressed concern over the maturity of the back-end code to open source LMSs in comparison with commercial systems. Three cited the lack of an inter-library loan module as a disadvantage, and two criticised limited acquisitions functionality. One interviewee believed that acquisitions and serials are also handled poorly by proprietary systems:

> *"With things such as serials and acquisitions then I don't know of any existing library system, commercial or open source that really has managed to properly get a handle on the processes around that."* (Interviewee 5)

Interviewee 5 also made a comparison between open source and current proprietary LMSs, when compared to emerging cloud-based systems:

> *"Koha is a good example of the current... library systems... it isn't... a competitor to the sort of things that are starting to come on to the market like Ex Libris Alma."* (Interviewee 5)

One interviewee believed the distinction between open source and proprietary LMSs to be unimportant:

> *"You look for the software that will do the job you want it to do to the best that it can be done, and whether it's open source isn't necessarily at the top of the decision making process."* (Interviewee 1)

4.2.3 Procurement

Interviewees were asked whether their institution will follow a formal procurement procedure for their next LMS. Two noted that they would, however neither felt that this would impact on their ability to choose an open source LMS. One intended to ask a third-party company to demonstrate an open source LMS or appraise it themselves, "installing it and then demonstrating... in the same way as we get a supplier to demonstrate" (Interviewee 3). A questionnaire respondent also planned to include open source in their tender process:

> *"An analysis of open source will certainly form part of a full LMS review in the next couple of years, carried out under E.U. auspices, to include support / running costs over a 5 year period."*

One interviewee noted that their institution followed a LMS planning cycle, which included an agreed period for changing systems. Another mentioned that they had no plans to move from their current supplier.

4.2.4 Cost

Many interviewees did not believe open source LMSs to be financially advantageous due to the additional resources required, for example:

> *"People often equate open source to be free, and that's not true. You might not have to buy the code... but you probably have to spend more local time in actually installing and understanding what's going on... "* (Interviewee 3)

One interviewee, however, had been able to implement the open source VuFind catalogue as no capital investment was required:

> *"We were able to just go live with it, and... because there was no money involved we could just sort of put it up there, see if it worked, and if it did work... we could sort of develop it, and if it didn't, well nothing ventured, nothing lost"* (Interviewee 5)

4.2.5 Pioneers

Interviewees were asked why institutions were reluctant to be the first to move to an open source LMS. Most agreed that it was an unknown quantity, and the lack of a reference site was of concern. One also commented that although an advantage to open source "is the user group side of it... if there aren't any other equivalent users then you won't get any of that" (Interviewee 1).

All interviewees believed that Staffordshire University's adoption of Koha could encourage others to investigate open source LMSs, though with the caveat that it may depend on their experience:

> *"Some people might say, let's just give it a year and see how it goes... if it's good for them, then there will potentially be more buy in"* (Interviewee 2)

> *"What a lot of sites will look to do is see how they're doing... what they're publishing... whether they're actually holding any kind of conferences... that will give people the confidence to go back to their institutions and actually at least consider it"* (Interviewee 3)

4.2.6 Support and hosting

Though all interviewees currently host their LMS, all are also considering commercial hosting. This was seen as beneficial for saving staff time, particularly during upgrades and maintenance:

> *"Updates are quite time consuming to do, with a lot of downtime and very often with very poor documentation."* (Interviewee 3)

This would allow staff more time to enhance their provision:

> *"We can concentrate on the bits that are more sexy and glamorous - developing new functionality and integrating those services with other things."* (Interviewee 5)

One interviewee with experience implementing VuFind was reluctant to opt for an open source LMS without support:

> *"We would certainly not have open source software for a system of that size that we didn't have support for from an external company... [VuFind] might be small enough for us to manage ourselves but anything bigger than that and we would definitely need to be able to have somebody to call on."* (Interviewee 5)

Opinions were mixed as to whether a wider range of support companies would encourage institutions to choose open source LMSs. One interviewee thought this could provide greater flexibility if support was unsatisfactory, while another believed it useful because "from a risk assessment point of view if there is only that one company and that company folds then you're a bit on your own" (Interviewee 4).

Conversely, quality rather than quantity was also seen as important:

"It doesn't really matter how many companies there are, so long as there's one that's actually good and has a good reputation." (Interviewee 1)

4.2.7 Staffing

Interviewees were asked whether they felt open source LMSs would take up more staff time and expertise than commercial systems. All but one thought that more expertise may be required, but opinions varied as to the form this would take. Three felt that if the system was supported, open source and commercial LMSs would be similar, but that additional expertise would be needed to modify the base code of an open source system. One felt that additional expertise would be needed to negotiate prices for customised development of an open source LMS.

No interviewees felt that additional staff time would be required for open source LMSs, but two felt that staffing may be used for development rather than support. A questionnaire respondent noted that, due to uncertain staffing levels within their institution, commercial software could be seen as a "safer option... because at least then if staff leave there is support for the system". One interviewee thought that next generation cloud-based LMSs may offer time saving:

"The interesting comparison is between those systems and this next generation and whether this next generation actually does mean that we can get away with less staff." (Interviewee 5)

4.2.8 Interoperability

Interviewees were asked whether open source LMSs would offer greater interoperability with other institutional systems. Four believed they would, though one disagreed, and one noted that it would require technical investment. The greater adherence to standards in OSS was seen as an advantage:

"*With open source when people are developing there is an obvious need... to actually make them compatible with existing standards... there is less drive for a commercial supplier to do so.*" (Interviewee 3)

4.2.9 UK specific issues

Interviewees were asked what they thought were the differences between UK academic libraries and other libraries' use of their LMS. Three noted the lack of consortia in the UK in comparison with other countries, such as the United States or Iceland. Two also mentioned

the uniqueness of the UK inter-library loan system, where the British Library handles requests centrally.

Interviewees were then asked whether these issues were addressed in their LMS, and the response was generally positive. For example, one noted:

> *"I think we get a fairly good deal in terms of how much time our supplier puts into making inter-library loans work for the UK given the return on investment for them."* (Interviewee 5)

Despite this, interviewees were unconcerned that open source LMSs may not have local functionality. One thought that inter-library loans could be managed by a separate system, while another thought that the nature of open source software would allow this to be addressed:

> *"I think the simple answer is that you go out and develop it! You get the community to develop it."* (Interviewee 4)

4.2.10 Modification

Every interviewee expressed interest in making changes to the source code of an open source LMS, though three were concerned about the technical skills required. One who expressed reservation over the richness of open source LMSs thought development would be necessary:

> *"If we did embark upon open source as a LMS that would be a given, that it would be part of our buy into it as well, that we would be helping to shape and develop a product."* (Interviewee 2)

Each interviewee noted different changes that they would be interested in making. One noted development of acquisitions and inter-library loan functionality, another showed an interest in enhancing reporting capability, while a third thought developing interoperability with their Finance and Human Resources systems would be advantageous.

4.2.11 Forking and compatibility

All interviewees expressed concern over retaining compatibility during upgrades. One view was that the nature of university libraries would encourage forking:

> *"There's a tendency... in certain universities to consider themselves to be unique in the way that they approach things... to try and twist the system to do what the institution*

has always done... Often that means breaking the system or twisting the system and using it in a way that it's not really supposed to be used and putting in place all sorts of weird workarounds. I think the danger if you've got an open source system that is easy to modify... is that sort of tendency would blossom."
(Interviewee 5)

4.2.12 Consortia

Interviewees were undecided whether a move towards consortia would lead to greater adoption of open source LMSs. One did not anticipate a trend towards consortia, while another commented that their existing commercial supplier has experience in providing systems for consortia. One interviewee thought adoption of Evergreen, the open source LMS built for consortia, would be advantageous if such developments occurred.

4.2.13 Community

Three interviewees cited the community development surrounding open source as beneficial, but disadvantages were also mentioned. One, noting experience with VuFind, was sceptical about developer commitment when programming for personal enjoyment rather than commercial incentive:

> *"All it takes is a few changes in personnel or a few leading sites, the voices that you always see on the mailing list... to disappear or to get interested in other things and then you've got software that isn't going anywhere."* (Interviewee 5)

Community support and development was also seen as mirroring the role of a commercial supplier's user group rather than an advantage specific to open source software.

4.3 Summary

These results depict a UK higher education sector undecided about open source LMSs. Generally, participants seemed content with their commercial LMS suppliers, despite showing enthusiasm towards open source software in general. Participants were knowledgeable about open source LMSs, particularly Koha, though reservations were expressed about staffing and skills required, retaining local customisation during upgrades and the lack of experience within the sector. Results will be discussed further within the context of the literature in the next chapter.

5. Discussion

5.1 Introduction

This chapter will compare the results with relevant literature, and in particular with the study of Adamson et al. (2008). In line with the research objectives, the author will suggest reasons why only one UK higher education institution has selected an open source LMS to date, compare the barriers towards open source LMS adoption identified in the literature with those perceived by research participants, propose drivers which may influence adoption in the future and discuss whether attitudes are likely to change.

5.2 Open source LMSs in UK higher education

As most questionnaire respondents (84%) had heard of open source LMSs, it seems unlikely that their institutions have not chosen these systems simply because they are unaware of their existence. Interviewees provided a range of replies when asked how they found out about open source LMSs, suggesting these have been well publicised, and adoption of Koha in UK school and health service libraries (Tedd, 2007a) illustrates that librarians in this country are willing to choose OSS. Therefore, differences with other sectors may provide an insight into why open source LMSs have yet to be adopted in higher education.

A majority of questionnaire respondents agreed they would not want to be the first UK higher education library to adopt an open source LMS. Interviews with systems librarians suggest the higher education community relies strongly on peer feedback, perhaps influenced by the academic world. This mirrors the views of Hoy and Koopman (2008, p. 57) and Adamson et al. (2008, p. 85), adding weight to the argument that academic libraries are more conservative and slower to adopt new systems than other libraries, preferring to wait until technologies have been tried and tested.

If the results are representative of the sector as a whole, trailblazers will be needed for open source LMSs to become widely adopted. Now that Staffordshire University have chosen Koha, other libraries may be waiting to learn from their experience and for a peer support community to grow before considering open source LMSs.

5.3 Comparison with Adamson et al.

The similarities between the results of this research and those of Adamson et al. (2008) are striking. Attitudes towards involvement with open source LMSs do not seem to have changed significantly in the last three years, though any conclusion is limited given the questionnaire response rate. This may be reflective of the perceived need for reference sites and, now that Staffordshire University have announced their intention to adopt Koha, a further study in several years may reveal changes in opinion depending on the experience at Staffordshire and any other universities choosing open source LMSs.

Despite these similarities, a slightly larger proportion of respondents to this study believe it possible they will adopt an open source LMS when compared to Adamson et al. (2008). This may be indicative of a shift in opinion, though may also be due to bias, with those enthusiastic about open source being perhaps more likely to complete the questionnaire.

5.4 Barriers to adoption

5.4.1 Motivation to change

The slow replacement cycle referred to by Adamson et al. (2008, p. 17) is reflected in the results, with very few LMSs purchased since 2004. As most respondents are satisfied with their current system there may be little motivation for change, whether to an open source LMS or another proprietary system, especially given the "complex, time-consuming and expensive" migration process (Cervone, as cited in Wang, 2009, p. 210). As mentioned by one interviewee, libraries may also be restricted to a long term planning cycle, and the high number of respondents who have no plans to change their LMS would suggest limited take-up of open source alternatives in the near future.

5.4.2 Financial constraints

The increasing cost of new library technologies and shrinking budgets faced by librarians (Wang, 2009, p. 209) might suggest that free alternatives would be considered attractive. On the contrary, the results suggest uncertain staffing levels within the sector may be a driver towards commercial support and hosting. This is perhaps unsurprising given the current financial constraints in higher education libraries. Although some respondents are considering open source LMSs, even the most enthusiastic are reluctant to do so without

external support, reflecting the view of Dimant (2010a, p. 666) that “most libraries in the UK are simply not resourced to carry out the implementation process themselves”.

5.4.3 Forking

One barrier to developing local functionality for the UK academic market is concern over retaining customisation during updates, and managing different versions to avoid forking should several libraries make changes. Every interviewee expressed both an interest in learning how to modify the source code of an open source LMS and a concern over how such modification may affect their ability to upgrade. Given the number of overseas Koha and Evergreen users it is questionable whether any local enhancements are likely to be accepted into the base code, even if UK academic libraries could co-operate and consolidate modifications into a single version or compatible add-ons. This may leave users in the sector with an outlier version, as Abram (2009) suggests.

A solution to this issue may be the management of enhancements by a support company, especially since third-party maintenance is the preferred support option, who can attempt to bring local enhancements into the software code on behalf of the wider user community. This might lead to a situation as described by Hopkinson (2009, p. 311), where libraries see little difference between commercial LMSs and supported open source LMSs, especially given the limited number of UK support companies available.

5.4.4 Customisation

It is notable that the ability to customise the source code was not seen to be of benefit by as many respondents as the other advantages of open source LMSs cited in the questionnaire. This may be due to the time and knowledge required to make alterations. The questionnaire results suggest, among respondents at least, staff time is a greater barrier than technical expertise.

5.5 Comparison with the literature

5.5.1 Purchasing procedures

Concern in the literature over procurement processes stifling open source LMS adoption (Jaffe & Careaga, 2007, p. 11; Chad, 2007) is not reflected in the results. Librarians enthusiastic about open source LMSs intend to include them in formal tendering procedures

either through a process of self-demonstration or by inviting tenders from third-party suppliers. This difference between the literature and the results may be explained by the lack of respondents interested in adopting an open source LMS without external support, as costs and credentials from a support company are likely to satisfy tender requirements. In this sense, findings seem to confirm Breeding's (2008a, p. 39) claim that libraries are unlikely to switch from contracted maintenance to paying for local support.

5.5.2 Functionality

The lack of specific functionality used by the sector, such as an inter-library loans module, does not seem to be a significant factor in discouraging participants from interest in open source LMSs. Interviewees seemed willing to either develop local customisation or use additional external systems to replace lost functionality. Existing functionality in proprietary systems may also be unsuited to the UK market, and the ability to customise open source LMSs could represent an opportunity to develop systems tailored towards the sector. Given the limited scope of the study, caution must be taken when making this generalisation and this may be an interesting area for future research.

The inadequate functionality reported in the study generally matched well with Hughes' (2010) examination; inter-library loans, serials and acquisitions were noted by participants in this respect, though no concerns were reported over circulation functionality which Hughes identifies as having nine category "D" failures against the UK Core Specification document. This difference may be due to participants being more familiar with Koha than Evergreen, the subject of Hughes' study. Statistical reporting is an area worth considering for development as identified by one interviewee; Hughes (2011, p. 37) notes that Evergreen does not provide pre-defined reports to meet SCONUL requirements however it would "appear to be fairly straightforward for [a] competent [systems administrator] to add", and the nature of open source systems may allow changes to be made to facilitate sector-specific reporting needs.

5.5.3 Interoperability

While results do reflect the need for interoperability referred to in the literature (e.g. Kinner & Rigda, 2009, p. 415), many of respondents' LMSs already interact with other relevant systems. Given the number of systems already interoperating and the development of APIs

in commercial LMSs, it is debatable whether interoperability is enough of a driver to encourage libraries to choose open source LMSs.

5.5.4 Documentation

The literature review identified the importance of good quality documentation to the success of open source (e.g. Schneider, 2009, p. 18). Most respondents seemed unsure of the documentation available for open source LMSs, which may be less crucial given that even the most enthusiastic interviewees seemed unlikely to consider adopting one without third-party assistance. Support companies may be required to develop documentation as part of their contract, which could help to narrow any gap between the quality of documentation for proprietary and open source LMSs.

One questionnaire respondent commented:

> *"I don't think there's enough documentation on open source LMSs, but our provider doesn't produce sufficient documentation on a lot of aspects of their LMS either."*

This may only be one opinion about a single vendor, but hints at the possibility there may not be a large gap in the quality of documentation between proprietary and open source LMSs. Whether this is the case or not, the results do not suggest poor documentation is considered a major barrier to open source LMS adoption, at least among participants.

5.5.5 The effect of library size

One unexpected result is the high proportion of respondents from libraries with less than ten staff who thought it unlikely they would adopt an open source LMS. This was not identified in the literature and, conversely, it could be argued that due to OSS being freely available, smaller institutions may be more likely to consider it. Respondents from libraries with less than ten staff did not answer differently to other groups when asked whether their library lacked the staffing to maintain an open source LMS suggesting that, if such a connection exists, it may be due to more complex reasons than simply the time or technical ability of systems librarians at small institutions. Further research may help to clarify whether this is finding is repeated across the sector, and reveal the reasons for it.

5.5.6 Koha bias

It is worth noting that all participants who commented on their experience with an open source LMS referred to Koha. Little was mentioned about any other open source LMSs, with the exception of several references to Evergreen in relation to consortia. It is therefore worth considering whether experience of Koha is colouring attitudes towards open source LMSs in general, and whether some concerns raised are not reflective of the open source LMS market as a whole. For example, Helling, advocating Evergreen, reports that:

> *"Evergreen has been far less buggy and far more reliable than Koha. Evergreen has also not had to face a 'fork' in its code in the way that Koha users have... Serials and Acquisitions modules are also expected to appear for Evergreen... making Evergreen much more appealing to larger systems and academic libraries"* (2010, p. 706).

While Helling's view represents just one opinion, it is worth considering whether the increasing publicity surrounding Evergreen and associated reports in the literature (e.g. Longwell, 2010; Molyneux, 2009; Helling, 2010) will influence the attitudes of those currently sceptical about Koha.

5.6 Future drivers affecting adoption

5.6.1 Software as a Service

Despite the interest in Software-as-a-Service (SaaS) identified by Breeding (2009a), no participants in this study, which may represent almost half the sector, reported using it. Interviewees' comments about SaaS were all positive; the only reason given for the lack of adoption to date was a concern over hosted data ownership. Perhaps another explanation is the recent decline in the purchase of new LMSs, with system migration being a logical time to change hosting arrangements. If the enthusiasm shown in this study is reflective of the general population, it will only be a matter of time before UK academic libraries start to outsource their hosting to commercial vendors. This may help to close the gap between proprietary and open source systems (Breeding, 2008a, p. 39), and provide a more equitable platform for a consortium purchase, as proposed by Adamson et al. (2008, p. 31), with no individual institution having to take a lead by hosting the system.

5.6.2 Consortia

There was general agreement among interviewees that open source LMSs could benefit consortia, though only 10 respondents reported sharing an LMS in this fashion. Given the references made to Evergreen in the context of consortia, any future partnerships among UK academic libraries may result in more interest in this LMS; this may be because Evergreen was developed for this purpose rather than because it is open source. Hughes (2011, p. 18) claims that lessons can be learned from the Evergreen community in forming constructive partnerships, with the open source model promoting a "let's work out exactly what we want, then we can make it happen" attitude over a "someone has to fix this" standpoint. This aligns with the view of interviewees that open source may be of benefit in a collaborative environment although, despite a government agenda that favours consortia, interviews did not reveal any intention to move in this direction at present.

5.6.3 Cloud-based systems

Existing open source systems mirror current large scale monolithic library systems, based on established process (Adamson et al., 2008, p. 17). As one interviewee claims, libraries may now be looking to next generation cloud-based systems. Future cloud-based LMSs may be based on open source components, as suggested by Adamson et al. (2008, pp. 22, 31), however may lead to a hosted implementation which is "fiercely proprietary" and allows the subscriber no access to the server in order to modify the base code since the binary software is not itself being distributed (O'Reilly, 2005, p. 466).

5.7 Summary

The results of this study suggest that open source LMSs are unlikely to be widely adopted in participants' libraries in the near future. The academic community is traditionally conservative in implementing new library technology, and this could be explained by a need for peer feedback. When combined with the lack of motivation to change systems and the current financial climate, which may be causing libraries to choose commercial solutions rather than rely on support staff, this could explain the current reluctance to adopt open source LMSs within the sector. Despite this, the research has revealed enthusiasm towards the open source model, and if Staffordshire University and other pioneers report positive experiences there may be a move towards these systems in the longer term.

Although SaaS has yet to be chosen by any respondents, it has been received with a positive attitude and it may be only a matter of time before it is adopted by university libraries. This has the potential to facilitate both open source LMS adoption and consortia, though may lead to open source LMSs being seen no differently to proprietary systems. SaaS hosting may just hint at a longer term future where libraries look to new, cloud-based LMSs, which present a whole new licensing model for librarians to evaluate.

6. Conclusion

This study set out to investigate attitudes towards open source LMSs in UK higher education, discover why these have yet to become widely adopted in the sector and examine whether attitudes are likely to change. The following chapter reviews this aim, evaluates the research process, provides suggestions for improvement during replication, summarises the findings from the study and considers how transferable these are to the sector as a whole.

6.1 Objectives

There were five objectives which the research intended to address:

1. To gain a historical background to open source LMSs;
2. To investigate advantages and disadvantages of open source software through analysis of the literature;
3. To research how librarians in the sector perceive these advantages and disadvantages in relation to LMSs;
4. To identify reasons why UK higher education libraries have yet to embrace open source LMSs;
5. To investigate whether attitudes are likely to change in the future.

6.2 Literature review

A review of literature from both information and computer science disciplines was conducted to provide a background to LMSs, open source software and open source LMSs, achieving the first objective.

References to advantages and disadvantages of the open source model were also sought, as specified in the second objective. As well as being free from financial cost, access to modify the source code, greater interoperability and vendor independence were identified as advantages to open source, while reduced stability, a need for technical ability, poor documentation and the threat of forking were cited as drawbacks.

The literature reveals a synergy between the library profession and the ideals of open source software, however paradoxically suggests librarians have been slow to adopt OSS for their own systems. Several reasons are proposed for this, including the greater support

resources needed, a lack of functionality compared with alternatives and procurement procedures favouring proprietary software.

Factors which may boost adoption of open source LMSs in the future, such as a movement towards SaaS hosting and an increase in consortia, were also identified.

6.3 Methodology

A mixed-methods research strategy was adopted. Quantitative data was gathered using an online questionnaire which was sent to all libraries within the sector to give a broad overview of attitudes towards open source LMSs. This was followed by qualitative telephone interviews with systems librarians to discuss the findings and explore the reasons behind differing opinions toward open source LMSs. Combining quantitative and qualitative research proved rewarding and allowed the researcher to take a snapshot of attitudes within the sector and discuss their merit with knowledgeable professionals in the field.

A questionnaire response rate of 46.4% was achieved, respectable for an unsolicited online questionnaire, though not high enough to confidently generalise findings to the population. This limits the value of statistical analysis. A possible bias towards respondents who are enthusiastic about OSS is suggested within the results; this is perhaps inevitable considering the topic, which is likely to elicit strong views. It is therefore recommended that the survey instrument is carefully reviewed before any replication to ensure impartiality and encourage an equal response from participants with opposing opinions, for example by balancing the question citing OSS advantages with one citing disadvantages.

While care was taken to select interviewees with a range of attitudes, those with less favourable opinions towards OSS provided less feedback, making it more difficult to ensure results remained unbiased. Addressing this problem in future research may allow a more thorough investigation of negative attitudes towards open source LMSs.

6.4 Findings

The findings have provided an insight into how librarians within UK higher education perceive open source LMSs and indications why the sector has yet to embrace them, achieving the third and fourth objectives. The need for peer feedback within the sector, impossible without early adopters, combined with a lack of motivation to change LMSs and

uncertainty over staffing in the current financial climate seems to have discouraged universities from selecting open source LMSs. Despite this, many participants showed enthusiasm towards the open source model and some barriers suggested by the literature, such as functionality gaps, documentation quality and formal procurement regulations, may not be enough to discourage adoption should other factors be favourable. Concerns over forking are evident and, while these may not prevent adoption, could result in librarians being more reluctant to customise open source LMSs.

The higher number of respondents considering adoption of an open source LMS in the current research compared to Adamson et al. (2008) is of note. While it is possible attitudes have shifted slightly towards acceptance of open source LMSs since 2008, it is also worth considering that this research has attracted respondents with an interest in the topic leading to a bias in the results.

A comparison of the findings with the literature hints at whether attitudes are likely to shift in the future to fulfil the final objective. The results suggest that a change in attitudes may depend on the experience of universities, such as Staffordshire, who adopt open source LMSs. Experience with other open source LMSs may also play a part in altering perceptions, as many participants only had knowledge of Koha. Other drivers for change may be a move to SaaS hosting, currently not used by participants but seen as a positive development, and any increase in consortia, though participants did not see this as likely in the near future. As these developments may take some time to be realised, and taking into account the small number of participants intending to change LMS in the next three years, it is unlikely that selection of open source LMSs will increase in the short term.

6.5 Generalisation

Comparison between the questionnaire and interviews show strong internal validity, and since the longitudinal design component revealed good correlation with Adamson et al. (2008) (see Table 1, Figure 7 and Figure 9) it could be argued that results are more transferable to the sector than would otherwise be the case. As questionnaire respondents were self-selected and number less than half of the total population, however, results cannot be generalised to the population with any significant degree of confidence. This is

particularly true of the interviews, as interviewees were selected by the researcher to provide a cross-section of differing views.

6.6 Summary

The library management system is currently at a pivotal point in its history. The large, monolithic proprietary systems slowly refined over the last few decades are becoming increasingly distant from the way modern academic libraries function as the focus shifts from printed to online resources. Open source LMSs represent an alternative and may allow universities to develop a system better suited to local practices, however UK higher education has yet to take advantage of these systems. Current open source LMSs are based on existing proprietary products and may soon be superseded by cloud-based systems designed to manage both print and electronic resources. University libraries will need to keep a close eye on developments to ensure effective use of their systems budget and keep customers satisfied in the increasingly demanding academic sector.

References

Abram, S. (2009). *Integrated library system platforms on open source*. Retrieved February 26, 2010, from http://stephenslighthouse.sirsidynix.com/Open%20Source%20Position%20Paper%2020090909%20FINAL%5B1%5D.pdf

Adamson, V., Bacsich, P., Chad, K., Kay, D., & Plenderleith, J. (2008). *JISC and SCONUL library management systems study*. Retrieved October 29, 2009, from http://www.jisc.ac.uk/media/documents/programmes/resourcediscovery/lmsstudy.pdf

Andrews, M. (2007). Changing markets, changing relationships: how libraries and vendors respond to the "next generation" challenge. *Library Hi Tech*, *25*(4), 562-578.

Bahr, E. (2007). Dreaming of a better ILS. *Computers in Libraries*, *27*(9), 10-14. Retrieved November 21, 2009, from EBSCOhost database.

Balnaves, E. (2008). Open source library management systems: a multidimensional evaluation. *Australian Academic & Research Libraries*, *39*(1), 1-13.

Barnes, S. (2001). Survey design. *Bristol Online Surveys (BOS) knowledgebase*. Retrieved November 27, 2010, from http://www.survey.bris.ac.uk/support/survey-design

Bartlett, S. (2009, July 21). Integrated library management systems: what we need. *Panlibus*. Retrieved February 4, 2010, from http://blogs.talis.com/panlibus/archives/2009/07/integrated-library-management-systems-what-we-need.php

Bartlett, S. (2010, February 1). Perceptions 2009: an international survey of library automation. *Panlibus*. Retrieved April 16, 2010, from http://blogs.talis.com/panlibus/archives/2010/02/perceptions-2009-an-international-survey-of-library-automation.php

Bissels, G. (2008). Implementation of an open source library management system: Experiences with Koha 3.0 at the Royal London Homoeopathic Hospital. *Program: electronic library and information systems*, *42*(3), 303-314. Retrieved October 29, 2009, from http://dx.doi.org/10.1108/00330330810892703

Boss, R. W. (2009). *Negotiating contracts with ILS vendors*. Retrieved September 11, 2011, from http://www.ala.org/ala/mgrps/divs/pla/tools/technotes/negotiatingils.cfm

Bourque, L. B., & Fielder, E. P. (2003). *How to conduct self-administered and mail surveys* (2nd ed.). London: Sage.

Breeding, M. (2002). The open source ILS: still only a distant possibility. *Information Technology and Libraries*, *21*(1), 16-18. Retrieved February 6, 2010, from http://www.librarytechnology.org/ltg-displaytext.pl?RC=9681

Breeding, M. (2005). Re-integrating the "integrated" library system. *Computers in Libraries*, *25*(1), 28-30. Retrieved February 6, 2010, from http://www.librarytechnology.org/ltg-displaytext.pl?RC=11340

Breeding, M. (2007a). An update on open source ILS. *Computers in Libraries*, *27*(3), 27-29. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2007b). It's time to break the mould of the original ILS. *Computers in Libraries*, *27*(10), 39-41. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2008a). Making a business case for open source ILS. *Computers in Libraries*, *28*(3), 36-39. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2008b). Open source library automation. *Library Technology Reports*, *44*(8).

Breeding, M. (2009a, October 31). Clifford Lynch clarifies views relative to open source ILS efforts. *GuidePosts: perspective and commentary by Marshall Breeding*. Retrieved October 31, 2009, from http://www.librarytechnology.org/blog.pl?ThreadID=134&BlogID=1

Breeding, M. (2009b). *History of library automation*. Retrieved February 4, 2010, from http://www.librarytechnology.org/automationhistory.pl

Breeding, M. (2009d). Library automation in a difficult economy. *Computers in Libraries*, *29*(3), 22-24. Retrieved February 6, 2010, from EBSCOhost database.

Breeding, M. (2009e). Opening up library automation software. *Computers in Libraries*, *29*(2), 25-27. Retrieved November 21, 2009, from EBSCOhost database.

Breeding, M. (2010). *Perceptions 2009: an international survey of library automation*. Retrieved February 4, 2010, from http://www.librarytechnology.org/perceptions2009.pl

British Sociological Association. (2002). *Statement of ethical practice for the British Sociological Association*. Retrieved December 6, 2010, from http://www.britsoc.co.uk/equality/Statement+Ethical+Practice.htm

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford: Oxford University Press.

Caldwell, T. (2007). Joy of the open road?. *Information World Review*, *238*, 18-20.

Chad, K. (2007, August 24 - September 6). The LMS: an open or shut case? *Library and Information Gazette*, p. 2.

Chudnov, D. (1999, February 1). Open source library systems: getting started. *oss4lib*. Retrieved February 4, 2010, from http://www.oss4lib.org/readings/oss4lib-getting-started.php

Creswell, J. W. (2009). *Research design* (3rd ed.). London: Sage.

Dimant, N. (2010a). Breaking the barriers: the role of support companies in making open source a reality. *Library Review*, *59*(9), 662-666. Retrieved August 25, 2011, from http://dx.doi.org/10.1108/00242531011086980

Dimant, N. (2010b, December 8). *Staffordshire University chooses the Koha hosted by PTFS Europe*, [Press Release]. London: PTFS Europe Ltd.

Esurveyspro. (2010). Retrieved October 28, 2010, from http://www.esurveyspro.com/

Ex Libris. (2006). *Francisco Partners to acquire Endeavor Information Systems from Elsevier*. Retrieved June 10, 2010, from http://www.exlibrisgroup.com/default.asp?catid=%7BEA905028-F9F0-41BD-A941-EBCF202EE007%7D&details_type=1&itemid=%7BC6D526DA-3971-4198-AC22-A64BA35CD1BA%7D

Fink, A. (2003a). *How to ask survey questions* (2nd ed.). London: Sage.

Fink, A. (2003b). *How to design survey studies* (2nd ed.). London: Sage.

Fink, A. (2003d). *The survey handbook* (2nd ed.). London: Sage.

Glass, R. L. (2005). Standing in front of the open source steamroller. In J. Feller, B. Fitzgerald, S. A. Hissam, & K. R. Lakhani (Eds.), *Perspectives on free and open source software* (pp. 81-92). Cambridge: MIT Press.

Google. (n.d.). Retrieved November 12, 2010, from http://www.google.co.uk/

Hadro, J. (2009a, October 15). LibLime's Enterprise Koha sets off debate. *Library Journal*, pp. 16-17. Retrieved February 6, 2010, from http://www.libraryjournal.com/article/CA6700348.html

Hadro, J. (2009b, December 15). SirsiDynix document on open source draws fire. *Library Journal*, p. 21. Retrieved February 6, 2010, from http://www.libraryjournal.com/article/CA6709750.html

Helling, J. (2010). Cutting the proprietary cord: a case study of one library's decision to migrate to an open source ILS. *Library Review*, *59*(9), 702-707. Retrieved August 25, 2011, from http://dx.doi.org/10.1108/00242531011087024

Higher Education Funding Council for England. (2011). *Funding for universities and colleges for 2010-11 and 2011-12*. Retrieved August 20, 2011, from http://www.hefce.ac.uk/pubs/circlets/2011/cl05_11/cl05_11.PDF

Hopkinson, A. (2009). Library automation in developing countries: the last 25 years. *Information Development*, *25*(4), 304-312. Retrieved February 6, 2010, from http://dx.doi.org/10.1177/0266666909349678

Hoy, G., & Koopman, M. S. (2008). Are Free and Open Source Software (FOSS) solutions a viable option for academic libraries in South Africa? *Innovation*, *36*, 56-63.

Hughes, M. (2010). *Evergreen versus United Kingdom Core Specification (UKCS): functional requirements for library management systems*. Retrieved November 30, 2010, from http://blog.swansea.ac.uk/blog/lshughmj/category/ossviab/

Hughes, M. (2011). Evergreen conference shows open source is flourishing. *CILIP Update*, *10*(6), 18-19.

Hyman, B., & Walker, J. (2008). *Case study: the Evergreen open source integrated library system; its origins and significant implementations in the USA and Canada*. Retrieved February 6, 2010, from http://archive.ifla.org/IV/ifla74/papers/159-Hyman_Walker-en.pdf

Jaffe, L., & Careaga, G. (2007). Standing up for open source. *Library Philosophy and Practice*, *9*(3). Retrieved July 17, 2010, from http://unllib.unl.edu/LPP/jaffe-careaga.pdf

Keats, D. (2008). Free and Open Source Software for librarians and libraries. *Innovation*, *36*, 1-16. Retrieved February 6, 2010, from EBSCOhost database.

Kinner, L., & Rigda, C. (2009). The integrated library system: from daring to dinosaur?. *Journal of Library Administration*, *49*(4), 401-417.

Krishnamurthy, M. (2008). Open access, open source and digital libraries: a current trend in university libraries around the world. *Program: electronic library and information systems*, *42*(1), 48-55. Retrieved October 29, 2009 from http://dx.doi.org/10.1108/00330330810851582

Kuali Foundation. (2010). *Kuali OLE*. Retrieved September 17, 2011, from http://www.kuali.org/ole

Lemon, J. S. (2007). *The effect of reminder intervals on response rates for web surveys*. Retrieved January 2, 2011, from http://www.abdn.ac.uk/surveys/documents/Survey_Patterns.pdf

List of universities in the United Kingdom. (n.d.). In *Wikipedia*. Retrieved July 22, 2010, from http://en.wikipedia.org/wiki/List_of_universities_in_the_United_Kingdom

Longwell, B. (2010). Coming soon to a library near you: an open source ILS. *OLA Quarterly*, *16*(3), 16-17.

Milligan, C., Archard, D., Biggs, H., Grinyer, A., Barrett, J., Ferdinand, J., et al. (n.d.). Core issues. *Social Science Research Ethics*. Retrieved June 25, 2011, from http://www.lancs.ac.uk/researchethics/1-1-intro.html

Molyneux, R. E. (2009). Evergreen in context. *Bulletin of the American Society for Information Science and Technology*, *35*(2), 26-30. Retrieved February 6, 2010, from http://dx.doi.org/10.1002/bult.2008.1720350208

Mutala, S. M. (2008). Emerging technologies: a paradigm shift for libraries in developing countries. In B. Dione & R. Savard (Eds.), *Managing technologies and automated library systems in developing countries: open source vs commercial options*, *IFLA Publications, 132* (pp. 107-125). Munchen: K.G. Saur.

O'Neil, G. (2008, February 12). Seven tips for better email invitations for web surveys. *Intelligent measurement*. Retrieved December 12, 2010, from http://intelligentmeasurement.wordpress.com/2008/02/12/seven-tips-for-better-email-invitations-for-web-surveys/

O'Reilly, T. (2005). The open source paradigm shift. In J. Feller, B. Fitzgerald, S. A. Hissam, & K. R. Lakhani (Eds.), *Perspectives on free and open source software* (pp. 461-481). Cambridge: MIT Press.

Pace, A. (2009). 21st century library systems. *Journal of Library Administration*, *49*(6), 641-650.

Poynder, R. (2001). Share and enjoy: open source might just be the answer to all our (software) problems. *Information World Review*, *172*, 13.

Rafiq, M. (2009). LIS community's perceptions towards open source software adoption in libraries. *The International Information and Library Review*, *41*, 137-145. Retrieved June 26, 2010, from http://dx.doi.org/10.1016/j.iilr.2009.07.001

Rafiq, M., & Ameen, K. (2008). Issues and lessons learned in open source software adoption in Pakistani libraries. *The Electronic Library*, *27*(4), 601-610. Retrieved April 26, 2010, from http://dx.doi.org/10.1108/02640470910979561

Ransom, J., Cormack, C., & Blake, R. (2009). How hard can it be?: developing in open source. *Code4Lib Journal*, *7*. Retrieved July 17, 2010, from http://journal.code4lib.org/articles/1638

Raymond, E. S. (1998). *Goodbye, "free software"; hello, "open source".* Retrieved February 4, 2010, from http://www.catb.org/~esr/open-source.html

Raymond, E. S. (1999). *The cathedral and the bazaar*. Sebastopol: O'Reilly.

Rhyno, A. (2008). Project Conifer. *Open Source Business Resource*. Retrieved February 4, 2010, from http://www.osbr.ca/ojs/index.php/osbr/article/view/691/657

Robson, C. (2002). *Real world research* (2nd ed.). Oxford: Blackwell Publishers Ltd.

Rogers, M. (2005). Sirsi acquires Dynix IL. *Library Journal*. Retrieved June 10, 2010, from http://www.libraryjournal.com/article/CA633317.html

Ruschoff, C. (2008). The integrated library system: are you ready for the next generation ILS?. *Technicalities*, *28*(6), 1-14.

Saffady, W. (1999). *Introduction to automation for librarians* (4th ed.). Chicago: American Library Association.

Schneider, K. G. (2009). The thick of the fray: open source software in libraries in the first decade of this century. *Bulletin of the American Society for Information Science*

and Technology, *35*(2), 15-19. Retrieved February 6, 2010, from http://dx.doi.org/10.1002/bult.2008.1720350206

Scott, D. (2010, January 24). In which I perceive that gossip is not science. *Coffee Code*. Retrieved July 8, 2010, from http://coffeecode.net/archives/209-In-which-I-perceive-that-gossip-is-not-science.html

Sero Consulting Ltd. (2009). *SCONUL HEFCE shared services study*. Retrieved October 28, 2010, from http://helibtech.com/file/view/091204%20SCONUL%20Shared%20Service%20-%20for%20distribution.pdf

Shell, K. (2011, February 16). *Stirling and East Dunbartonshire Councils choose Evergreen open source library management system*, [Press Release]. London: PTFS Europe Ltd.

St. Laurent, A. M. (2004). *Understanding open source and free software licensing*. Sebastopol: O'Reilly Media.

Survey Monkey. (2010). Retrieved October 28, 2010, from http://www.surveymonkey.com/

Tedd, L. (2007a). *Going down the open road: open source software and library management systems*. Retrieved October 29, 2009, from http://hdl.handle.net/2160/346

Tedd, L. (2007c). *Library management systems*. Retrieved September 11, 2011, from http://hdl.handle.net/2160/679

Tedd, L. (2007d). Library management systems in the UK: 1960s–1980s. *Library History*, *23*(4), 301-316. Retrieved February 6, 2010, from http://hdl.handle.net/2160/566

Tennant, R. (2008, April 16). Picking when to jump, part 2. *Library Journal*. Retrieved October 29, 2009, from http://www.libraryjournal.com/blog/1090000309/post/1770023177.html

Tennant, R. (2009, September 15). LibLime to the Koha community: fork you! *Library Journal*. Retrieved April 16, 2010, from http://blog.libraryjournal.com/tennantdigitallibraries/2009/09/15/liblime-to-the-koha-community-fork-you/

The Conifer Group. (2007). *The Conifer Project: re-inventing the ILS: a white paper*. Retrieved June 10, 2010, from http://conifer.mcmaster.ca/files/Conifer+Project+-+White+Paper+-+Nov+27+2007.doc

Trainor, C. (2009). Open source, crowd source: harnessing the power of the people behind our libraries. *Program: electronic library and information systems*, *43*(3), 288-298. Retrieved February 6, 2010, from http://dx.doi.org/10.1108/00330330910978581

UCAS. (n.d.). *List of universities and colleges*. Retrieved July 22, 2010, from http://www.ucas.com/students/choosingcourses/choosinguni/instguide/

Wang, Z. (2009). Integrated library system (ILS) challenges and opportunities: a survey of US academic libraries with migration projects. *The Journal of Academic Librarianship*, *35*(3), 207-220. Retrieved February 6, 2010, from http://dx.doi.org/10.1016/j.acalib.2009.03.024

Welsh Assembly Government. (2008). *CyMAL: Museums Archives and Libraries Wales action plan: April 2008 - March 2011*. Retrieved May 27, 2010, from http://wales.gov.uk/docs//drah/publications/081208cymalactionplan2008to2011en.pdf

Wikipedia, the free encyclopedia. (n.d.). Retrieved November 12, 2010, from http://en.wikipedia.org/wiki/Main_Page

Full bibliography

Abram, S. (2009). *Integrated library system platforms on open source*. Retrieved February 26, 2010, from http://stephenslighthouse.sirsidynix.com/Open%20Source%20Position%20Paper%2020090909%20FINAL%5B1%5D.pdf

Adamson, V., Bacsich, P., Chad, K., Kay, D., & Plenderleith, J. (2008). *JISC and SCONUL library management systems study*. Retrieved October 29, 2009, from http://www.jisc.ac.uk/media/documents/programmes/resourcediscovery/lmsstudy.pdf

Akeroyd, J. (1999). The integrated library system: yesterday, today and tomorrow. *Information UK Outlooks*, *33*. London: South Bank University.

Andrews, M. (2007). Changing markets, changing relationships: how libraries and vendors respond to the "next generation" challenge. *Library Hi Tech*, *25*(4), 562-578.

Bahr, E. (2007). Dreaming of a better ILS. *Computers in Libraries*, *27*(9), 10-14. Retrieved November 21, 2009, from EBSCOhost database.

Balas, J. L. (2007). Will the ILS soon be as obsolete as the card catalog? *Computers in Libraries*, *27*(9), 41-43. Retrieved November 21, 2009, from EBSCOhost database.

Balnaves, E. (2008). Open source library management systems: a multidimensional evaluation. *Australian Academic & Research Libraries*, *39*(1), 1-13.

Barnes, S. (2001). Survey design. *Bristol Online Surveys (BOS) knowledgebase*. Retrieved November 27, 2010, from http://www.survey.bris.ac.uk/support/survey-design

Bartlett, S. (2009, July 21). Integrated library management systems: what we need. *Panlibus*. Retrieved February 4, 2010, from http://blogs.talis.com/panlibus/archives/2009/07/integrated-library-management-systems-what-we-need.php

Bartlett, S. (2010, February 1). Perceptions 2009: an international survey of library automation. *Panlibus*. Retrieved April 16, 2010, from http://blogs.talis.com/panlibus/archives/2010/02/perceptions-2009-an-international-survey-of-library-automation.php

Bissels, G. (2008). Implementation of an open source library management system: Experiences with Koha 3.0 at the Royal London Homoeopathic Hospital. *Program: electronic library and information systems*, *42*(3), 303-314. Retrieved October 29, 2009, from http://dx.doi.org/10.1108/00330330810892703

Boss, R. W. (2009). *Negotiating contracts with ILS vendors*. Retrieved September 11, 2011, from http://www.ala.org/ala/mgrps/divs/pla/tools/technotes/negotiatingils.cfm

Bourque, L. B., & Fielder, E. P. (2003). *How to conduct self-administered and mail surveys* (2nd ed.). London: Sage.

Breeding, M. (2002). The open source ILS: still only a distant possibility. *Information Technology and Libraries*, *21*(1), 16-18. Retrieved February 6, 2010, from http://www.librarytechnology.org/ltg-displaytext.pl?RC=9681

Breeding, M. (2005). Re-integrating the "integrated" library system. *Computers in Libraries*, *25*(1), 28-30. Retrieved February 6, 2010, from http://www.librarytechnology.org/ltg-displaytext.pl?RC=11340

Breeding, M. (2006). Reshuffling the deck. *Library Journal*, *131*(6), 40-54. Retrieved November 21, 2009, from EBSCOhost database.

Breeding, M. (2007a). An update on open source ILS. *Computers in Libraries*, *27*(3), 27-29. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2007b). It's time to break the mould of the original ILS. *Computers in Libraries*, *27*(10), 39-41. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2008a). Making a business case for open source ILS. *Computers in Libraries*, *28*(3), 36-39. Retrieved October 29, 2009, from EBSCOhost database.

Breeding, M. (2008b). Open source library automation. *Library Technology Reports*, *44*(8).

Breeding, M. (2009a, October 31). Clifford Lynch clarifies views relative to open source ILS efforts. *GuidePosts: perspective and commentary by Marshall Breeding*. Retrieved October 31, 2009, from http://www.librarytechnology.org/blog.pl?ThreadID=134&BlogID=1

Breeding, M. (2009b). *History of library automation*. Retrieved February 4, 2010, from http://www.librarytechnology.org/automationhistory.pl

Breeding, M. (2009c). Investing in the future: automation marketplace 2009. *Library Journal*, *134*(6). Retrieved July 17, 2010, from http://www.libraryjournal.com/article/CA6645868.html

Breeding, M. (2009d). Library automation in a difficult economy. *Computers in Libraries*, *29*(3), 22-24. Retrieved February 6, 2010, from EBSCOhost database.

Breeding, M. (2009e). Opening up library automation software. *Computers in Libraries*, *29*(2), 25-27. Retrieved November 21, 2009, from EBSCOhost database.

Breeding, M. (2009f). Opening up library systems. *American Libraries*, *40*(12), 33.

Breeding, M. (2009g). Opening up library systems through web services and SOA: hype, or reality?. *Library Technology Reports*, *45*(8).

Breeding, M. (2009h). The elusive cost of library software. *Computers in Libraries*, *29*(8), 28-30. Retrieved November 21, 2009, from EBSCOhost database.

Breeding, M. (2009i). The viability of open source ILS. *Bulletin of the American Society for Information Science and Technology*, *35*(2), 20-25.

Breeding, M. (2010). *Perceptions 2009: an international survey of library automation*. Retrieved February 4, 2010, from http://www.librarytechnology.org/perceptions2009.pl

British Sociological Association. (2002). *Statement of ethical practice for the British Sociological Association*. Retrieved December 6, 2010, from http://www.britsoc.co.uk/equality/Statement+Ethical+Practice.htm

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford: Oxford University Press.

Caldwell, T. (2007). Joy of the open road?. *Information World Review*, *238*, 18-20.

Cargile, C. (2005). Open source ILS for the non-systems librarian: a reality?. *PNLA Quarterly*, *69*(3), 15-16.

Cervone, F. (2007). ILS migration in the 21st century: some new things to think about this time around. *Computers in Libraries*, *27*(7), 6-62. Retrieved February 6, 2010, from EBSCOhost database.

Chad, K. (2007, August 24 - September 6). The LMS: an open or shut case? *Library and Information Gazette*, p. 2.

Chudnov, D. (1999, February 1). Open source library systems: getting started. *oss4lib*. Retrieved February 4, 2010, from http://www.oss4lib.org/readings/oss4lib-getting-started.php

Chudnov, D. (2009). What librarians still don't know about free software. *Computers in Libraries*, *29*(2), 22-24. Retrieved November 21, 2009, from EBSCOhost database.

Cohn, J. M., Kelsey, A. L., & Fiels, K. M. (2002). *Planning for integrated systems and technologies: a how-to-do-it manual for librarians* (2nd ed.). London: Facet Publishing.

Cree, J. S. (1998). Library systems migration: technical and management considerations. *Library Information Technology Centre Report, 12*. London: South Bank University.

Creswell, J. W. (2009). *Research design* (3rd ed.). London: Sage.

DiBona, C., Ockman, S., & Stone, M. (Eds.). (1999). *Open sources: voices from the revolution*. Sebastopol: O'Reilly Media.

Dimant, N. (2010a). Breaking the barriers: the role of support companies in making open source a reality. *Library Review*, *59*(9), 662-666. Retrieved August 25, 2011, from http://dx.doi.org/10.1108/00242531011086980

Dimant, N. (2010b, December 8). *Staffordshire University chooses the Koha hosted by PTFS Europe*, [Press Release]. London: PTFS Europe Ltd.

Engard, N. C. (2009). Surveys. *Open Sesame*. Retrieved November 25, 2010, from http://blogs.liblime.com/open-sesame/archives/category/surveys

Esurveyspro. (2010). Retrieved October 28, 2010, from http://www.esurveyspro.com/

Ex Libris. (2006). *Francisco Partners to acquire Endeavor Information Systems from Elsevier*. Retrieved June 10, 2010, from http://www.exlibrisgroup.com/default.asp?catid=%7BEA905028-F9F0-41BD-A941-EBCF202EE007%7D&details_type=1&itemid=%7BC6D526DA-3971-4198-AC22-A64BA35CD1BA%7D

Ex Libris. (2011). *Ex Libris Alma*. Retrieved August 25, 2011, from http://www.exlibrisgroup.com/category/AlmaOverview

Fink, A. (2003a). *How to ask survey questions* (2nd ed.). London: Sage.

Fink, A. (2003b). *How to design survey studies* (2nd ed.). London: Sage.

Fink, A. (2003c). *How to sample in surveys* (2nd ed.). London: Sage.

Fink, A. (2003d). *The survey handbook* (2nd ed.). London: Sage.

Fitzpatrick, S. (2009). Open source advocates reject SirsiDynix's warning. *American Libraries*, *40*(12), 30.

Florin, J. (2011). Koha: choosing and implementing an open source integrated library management system. *ALISS Quarterly*, *6*(2), 13-15.

Georgia Public Library Service. (2009a). *Evergreen open source library system*. Retrieved November 11, 2009, from http://www.open-ils.org/

Georgia Public Library Service. (2009b). *Georgia PINES catalog*. Retrieved November 11, 2009, from http://gapines.org/opac/en-US/skin/default/xml/index.xml

Glass, R. L. (2005). Standing in front of the open source steamroller. In J. Feller, B. Fitzgerald, S. A. Hissam, & K. R. Lakhani (Eds.), *Perspectives on free and open source software* (pp. 81-92). Cambridge: MIT Press.

Google. (n.d.). Retrieved November 12, 2010, from http://www.google.co.uk/

Hadro, J. (2009a, October 15). LibLime's Enterprise Koha sets off debate. *Library Journal*, pp. 16-17. Retrieved February 6, 2010, from http://www.libraryjournal.com/article/CA6700348.html

Hadro, J. (2009b, December 15). SirsiDynix document on open source draws fire. *Library Journal*, p. 21. Retrieved February 6, 2010, from http://www.libraryjournal.com/article/CA6709750.html

Hadro, J. (2009c, October 30). SirsiDynix report on open source: promoting debate or sowing fear? *Library Journal*. Retrieved February 6, 2010, from http://www.libraryjournal.com/article/CA6704622.html

Harris, S. (2008). Library management systems embrace change. *Research Information*, *39*, 20-24. Retrieved October 29, 2009, from http://www.researchinformation.info/features/feature.php?feature_id=198

Haydock, I. (2009, January 11). Open source library management systems. *Meeting on the ledge*. Retrieved November 25, 2010, from http://ianhaydock.wordpress.com/2009/01/11/open-source-library-management-systems/

Helling, J. (2010). Cutting the proprietary cord: a case study of one library's decision to migrate to an open source ILS. *Library Review*, *59*(9), 702-707. Retrieved August 25, 2011, from http://dx.doi.org/10.1108/00242531011087024

Higher Education Funding Council for England. (2011). *Funding for universities and colleges for 2010-11 and 2011-12*. Retrieved August 20, 2011, from http://www.hefce.ac.uk/pubs/circlets/2011/cl05_11/cl05_11.PDF

Hopkinson, A. (2007). CDS/ISIS information. *Information Development*, *23*(2/3), 106-109. Retrieved February 4, 2010, from http://dx.doi.org/10.1177/0266666907078577

Hopkinson, A. (2009). Library automation in developing countries: the last 25 years. *Information Development*, *25*(4), 304-312. Retrieved February 6, 2010, from http://dx.doi.org/10.1177/0266666909349678

Hoy, G., & Koopman, M. S. (2008). Are Free and Open Source Software (FOSS) solutions a viable option for academic libraries in South Africa? *Innovation*, *36*, 56-63.

Hughes, M. (2010). *Evergreen versus United Kingdom Core Specification (UKCS): functional requirements for library management systems*. Retrieved November 30, 2010, from http://blog.swansea.ac.uk/blog/lshughmj/category/ossviab/

Hughes, M. (2011). Evergreen conference shows open source is flourishing. *CILIP Update*, *10*(6), 18-19.

Hyman, B., & Walker, J. (2008). *Case study: the Evergreen open source integrated library system; its origins and significant implementations in the USA and Canada*. Retrieved February 6, 2010, from http://archive.ifla.org/IV/ifla74/papers/159-Hyman_Walker-en.pdf

Is open source software the solution? (2009). *Library & Information Update*, *8*(3), 10.

Jaffe, L., & Careaga, G. (2007). Standing up for open source. *Library Philosophy and Practice*, *9*(3). Retrieved July 17, 2010, from http://unllib.unl.edu/LPP/jaffe-careaga.pdf

Joint Information Systems Committee. (2009). *OSS Watch: open source software advisory service*. Retrieved November 11, 2009, from http://www.oss-watch.ac.uk/

Keats, D. (2008). Free and Open Source Software for librarians and libraries. *Innovation*, *36*, 1-16. Retrieved February 6, 2010, from EBSCOhost database.

Kinner, L., & Rigda, C. (2009). The integrated library system: from daring to dinosaur?. *Journal of Library Administration*, *49*(4), 401-417.

Koha: open source integrated library system. (2009). Retrieved November 11, 2009, from http://koha.org/

Krishnamurthy, M. (2008). Open access, open source and digital libraries: a current trend in university libraries around the world. *Program: electronic library and information systems*, *42*(1), 48-55. Retrieved October 29, 2009 from http://dx.doi.org/10.1108/00330330810851582

Kuali Foundation. (2010). *Kuali OLE*. Retrieved September 17, 2011, from http://www.kuali.org/ole

Lemon, J. S. (2007). *The effect of reminder intervals on response rates for web surveys*. Retrieved January 2, 2011, from http://www.abdn.ac.uk/surveys/documents/Survey_Patterns.pdf

List of universities in the United Kingdom. (n.d.). In *Wikipedia*. Retrieved July 22, 2010, from http://en.wikipedia.org/wiki/List_of_universities_in_the_United_Kingdom

Longwell, B. (2010). Coming soon to a library near you: an open source ILS. *OLA Quarterly*, *16*(3), 16-17.

Mason, J. (2002). *Qualitative researching* (2nd ed.). London: Sage Publications Ltd.

Milligan, C., Archard, D., Biggs, H., Grinyer, A., Barrett, J., Ferdinand, J., et al. (n.d.). Core issues. *Social Science Research Ethics*. Retrieved June 25, 2011, from http://www.lancs.ac.uk/researchethics/1-1-intro.html

Molyneux, R. E. (2009). Evergreen in context. *Bulletin of the American Society for Information Science and Technology*, *35*(2), 26-30. Retrieved February 6, 2010, from http://dx.doi.org/10.1002/bult.2008.1720350208

Molyneux, R. E., & Rylander, M. (2010). The state of Evergreen: Evergreen at three. *Library Review*, *59*(9), 667-676. Retrieved August 25, 2011, from http://dx.doi.org/10.1108/00242531011086999

Murray, R. (2006). Library systems: synthesise, specialise, mobilise. *Ariadne*, *48*. Retrieved October 29, 2009, from http://www.ariadne.ac.uk/issue48/murray/

Mutala, S. M. (2008). Emerging technologies: a paradigm shift for libraries in developing countries. In B. Dione & R. Savard (Eds.), *Managing technologies and automated library systems in developing countries: open source vs commercial options*, *IFLA Publications, 132* (pp. 107-125). Munchen: K.G. Saur.

O'Neil, G. (2008, February 12). Seven tips for better email invitations for web surveys. *Intelligent measurement*. Retrieved December 12, 2010, from http://intelligentmeasurement.wordpress.com/2008/02/12/seven-tips-for-better-email-invitations-for-web-surveys/

O'Reilly, T. (2005). The open source paradigm shift. In J. Feller, B. Fitzgerald, S. A. Hissam, & K. R. Lakhani (Eds.), *Perspectives on free and open source software* (pp. 461-481). Cambridge: MIT Press.

Oishi, S. M. (2003). *How to conduct in-person interviews for surveys* (2nd ed.). London: Sage Publications.

Open source. (n.d.). In *Wikipedia*. Retrieved February 4, 2010, from http://en.wikipedia.org/wiki/Open_source

Open Source Initiative. (2010). *History of the OSI (Open Source Initiative)*. Retrieved February 4, 2010, from http://www.opensource.org/history

Open source library systems reality check. (2008). *Library & Information Update*, *7*(9), 8.

Pace, A. (2009). 21st century library systems. *Journal of Library Administration*, *49*(6), 641-650.

Phillips, L. (2009). Information sharing innovations: open source CMS and ILS. *PNLA Quarterly*, *74*(1), 4-5.

Poynder, R. (2001). Share and enjoy: open source might just be the answer to all our (software) problems. *Information World Review*, *172*, 13.

Project Conifer. (2009, November 11). *Project Conifer: news*. Retrieved November 11, 2009, from http://conifer.mcmaster.ca/

Project SITKA. (2009). *Welcome to Sitka*. Retrieved November 11, 2009, from http://sitka.bclibraries.ca/

Rafiq, M. (2009). LIS community's perceptions towards open source software adoption in libraries. *The International Information and Library Review*, *41*, 137-145. Retrieved June 26, 2010, from http://dx.doi.org/10.1016/j.iilr.2009.07.001

Rafiq, M., & Ameen, K. (2008). Issues and lessons learned in open source software adoption in Pakistani libraries. *The Electronic Library*, *27*(4), 601-610. Retrieved April 26, 2010, from http://dx.doi.org/10.1108/02640470910979561

Ransom, J., Cormack, C., & Blake, R. (2009). How hard can it be?: developing in open source. *Code4Lib Journal*, *7*. Retrieved July 17, 2010, from http://journal.code4lib.org/articles/1638

Raymond, E. S. (1998). *Goodbye, "free software"; hello, "open source".* Retrieved February 4, 2010, from http://www.catb.org/~esr/open-source.html

Raymond, E. S. (1999). *The cathedral and the bazaar*. Sebastopol: O'Reilly.

Rethink the academic library, says LMS report. (2008). *Library & Information Update*, *7*(5), 15.

Rhyno, A. (2008). Project Conifer. *Open Source Business Resource*. Retrieved February 4, 2010, from http://www.osbr.ca/ojs/index.php/osbr/article/view/691/657

Robson, C. (2002). *Real world research* (2nd ed.). Oxford: Blackwell Publishers Ltd.

Rogers, M. (2005). Sirsi acquires Dynix IL. *Library Journal*. Retrieved June 10, 2010, from http://www.libraryjournal.com/article/CA633317.html

Ruschoff, C. (2008). The integrated library system: are you ready for the next generation ILS?. *Technicalities*, *28*(6), 1-14.

Saffady, W. (1999). *Introduction to automation for librarians* (4th ed.). Chicago: American Library Association.

Schneider, K. G. (2009). The thick of the fray: open source software in libraries in the first decade of this century. *Bulletin of the American Society for Information Science and Technology*, *35*(2), 15-19. Retrieved February 6, 2010, from http://dx.doi.org/10.1002/bult.2008.1720350206

Scott, D. (2010, January 24). In which I perceive that gossip is not science. *Coffee Code*. Retrieved July 8, 2010, from http://coffeecode.net/archives/209-In-which-I-perceive-that-gossip-is-not-science.html

Sero Consulting Ltd. (2009). *SCONUL HEFCE shared services study*. Retrieved October 28, 2010, from http://helibtech.com/file/view/091204%20SCONUL%20Shared%20Service%20-%20for%20distribution.pdf

Sheehan, K. (2009). Creating open source conversation. *Computers in Libraries*, *29*(2), 8-11. Retrieved November 21, 2009, from EBSCOhost database.

Shell, K. (2011, February 16). *Stirling and East Dunbartonshire Councils choose Evergreen open source library management system*, [Press Release]. London: PTFS Europe Ltd.

St. Laurent, A. M. (2004). *Understanding open source and free software licensing*. Sebastopol: O'Reilly Media.

Survey Monkey. (2010). Retrieved October 28, 2010, from http://www.surveymonkey.com/

Tedd, L. (2007a). *Going down the open road: open source software and library management systems*. Retrieved October 29, 2009, from http://hdl.handle.net/2160/346

Tedd, L. (2007b). *Library management systems: current issues and developments*. Presented at the Umbrella 2007 conference of the Chartered Institute of Library and Information Professionals, Hatfield. Retrieved February 6, 2010, from http://hdl.handle.net/2160/314

Tedd, L. (2007c). *Library management systems*. Retrieved September 11, 2011, from http://hdl.handle.net/2160/679

Tedd, L. (2007d). Library management systems in the UK: 1960s–1980s. *Library History*, *23*(4), 301-316. Retrieved February 6, 2010, from http://hdl.handle.net/2160/566

Tennant, R. (2007). Dawn of a new era. *Library Journal*, *132*(3), 27. Retrieved October 29, 2009, from EBSCOhost database.

Tennant, R. (2008, April 16). Picking when to jump, part 2. *Library Journal*. Retrieved October 29, 2009, from http://www.libraryjournal.com/blog/1090000309/post/1770023177.html

Tennant, R. (2009, September 15). LibLime to the Koha community: fork you! *Library Journal*. Retrieved April 16, 2010, from

http://blog.libraryjournal.com/tennantdigitallibraries/2009/09/15/liblime-to-the-koha-community-fork-you/

Tešendic, D., Milosavljevic, B., & Surla, D. (2009). A library circulation system for city and special libraries. *The Electronic Library*, *27*(1), 162-186. Retrieved October 29, 2009, from http://dx.doi.org/10.1108/02640470910934669

The Conifer Group. (2007). *The Conifer Project: re-inventing the ILS: a white paper*. Retrieved June 10, 2010, from http://conifer.mcmaster.ca/files/Conifer+Project+-+White+Paper+-+Nov+27+2007.doc

Trainor, C. (2009). Open source, crowd source: harnessing the power of the people behind our libraries. *Program: electronic library and information systems*, *43*(3), 288-298. Retrieved February 6, 2010, from http://dx.doi.org/10.1108/00330330910978581

UCAS. (n.d.). *List of universities and colleges*. Retrieved July 22, 2010, from http://www.ucas.com/students/choosingcourses/choosinguni/instguide/

Walker, J., & Singleton, D. (2006). *Evergreen: the ILS is open and everyone is invited*. Retrieved November 21, 2009, from http://www.usg.edu/galileo/gold/2006/walker_evergreen.pdf

Wallis, R. (2009, September 17). LibLime cause upset in the open source community. *Panlibus*. Retrieved April 16, 2010, from http://blogs.talis.com/panlibus/archives/2009/09/liblime-cause-upset-in-the-open-source-community.php

Wang, Z. (2009). Integrated library system (ILS) challenges and opportunities: a survey of US academic libraries with migration projects. *The Journal of Academic Librarianship*, *35*(3), 207-220. Retrieved February 6, 2010, from http://dx.doi.org/10.1016/j.acalib.2009.03.024

Weber, J. (2006). Evergreen: your homegrown ILS. *Library Journal*, *131*(19), 38-41. Retrieved October 29, 2009, from http://www.libraryjournal.com/article/CA6396354.html

Welsh Assembly Government. (2008). *CyMAL: Museums Archives and Libraries Wales action plan: April 2008 - March 2011*. Retrieved May 27, 2010, from http://wales.gov.uk/docs//drah/publications/081208cymalactionplan2008to2011en.pdf

Welsh Repository Network. (2009). *Repository hardware case studies.* Retrieved May 27, 2010, from http://hdl.handle.net/2160/1881

Wikipedia, the free encyclopedia. (n.d.). Retrieved November 12, 2010, from http://en.wikipedia.org/wiki/Main_Page

Zou, Q., & Liu, G. (2009). Chinese localisation of Evergreen: an open source integrated library system. *Program: electronic library and information systems*, *43*(1), 49-61. Retrieved October 29, 2009, from http://dx.doi.org/10.1108/00330330910934101

Appendix A: Literature search plan

Sources → / Search terms /phrases ↓	LISA	LISTA	AU Voyager	Google Scholar	AU eLibrary	JSTOR	Index to Theses	Google	Yahoo	Welsh Repository Network
1. Relating to Library Management Systems										
Automated Library System										
Automated System										
ILS										
Integrated Library Management System										
Integrated Library System										
IOLS										
Integrated Online Library System										
Library Automation System										
Library Management System										
Library System										
LMS										
2. Relating to Open Source Software										
COSS										
FOSS										
free software										
GNU										
open source										
open-source										
OSS										
3. Open Source Library Management Systems										
Emilda										
Evergreen										
Gnuteca										
Koha										
NewGenLib										
Open Biblio										
OPALS										
PhpMyLibrary										
PMB										

Notes:
The term "Integrated Library System" (ILS) is often used in North America, while "Library Management System" (LMS) is generally used in the UK.
The term "open source software" is not included in this table as the phrase search for "open source" will also retrieve matches for "open source software"

Appendix B: Methodology examination of related research

Author	Year	Title	Population	Sample	Sampling method	No. Responses	Response rate	Primary Strategy	Method	Design(s)
Adamson et al.	2008	Library Management Systems study (survey)	UK higher education libraries	all	all	100	Unknown	Quantitative	online questionnaire	cross-sectional
Adamson et al.	2008	Library Management Systems study (vendor interviews)	LMS vendors	top 4 UK vendors	top 4 UK vendors	4	-	Qualitative	interviews	cross-sectional
Adamson et al.	2008	Library Management Systems study (reference group)	Consultants and senior librarians	17	self-selected	17	-	Qualitative	focus group	cross-sectional
Breeding	2010	Perceptions 2009	Libraries worldwide	invitational	all	2098 (1633 US, 80 UK)	Unknown	Quantitative	online questionnaire	cross-sectional; longitudinal
Bahr	2007	Dreaming of a better ILS	Library technology experts	7	self-selected	7	-	Qualitative	survey	cross-sectional (journalistic)
Wang	2009	Integrated library system (ILS) challenges and opportunities	US academic libraries with systems migration projects 2004 - 2008	all	all	33 (52.38%)	52.38%	Quantitative	online questionnaire	cross-sectional
Rafiq	2009	LIS community's perceptions towards open source software adoption in libraries	LIS professionals	personal emails; call via discussion groups	self-selected; convenience	370 (48 countries)	-	Quantitative	online questionnaire	cross-sectional

Appendix C: Final questionnaire hosted at Survey Monkey

Open Source Library Management Systems Survey

The purpose of this survey is to examine attitudes towards open source Library Management Systems among Higher Education libraries in the United Kingdom. The survey contains a maximum of 29 questions.

Your response will remain confidential and all published results will be anonymised. The author would like to conduct interviews with several resondents who have differing views on this subject. If you choose to supply your contact details in question 28 these will only be used to identify candidates for this purpose. Contact details supplied in question 29 will only be used to compile a mailing list for the results, and will not be processed with the remainder of the survey.

Questions 4, 19 and 20 have been adapted from the JISC & SCONUL LMS Study Project survey (2008) for comparison purposes, and are used with the kind permission of David Kay, SERO Consulting.

1. What Library Management System (LMS) do you currently use?

Examples of products: Voyager, Horizon, Millennium

Examples of vendors: Ex Libris, SirsiDynix, Innovative Interfaces

Product

Vendor

2. In what year did you purchase your current LMS?

3. How satisfied are you with your...

	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied
current LMS?	◯	◯	◯	◯	◯
current vendor?	◯	◯	◯	◯	◯
current support?	◯	◯	◯	◯	◯

4. Where is your LMS server currently hosted?

You can select ONE option only. If your institution has an integrated library and IT department, and your server is located within this department, please choose "Within your library service".

- ◯ Within your library service
- ◯ In the IT Department
- ◯ Externally - by another institution
- ◯ Externally - by the vendor (Software-as-a-Service)
- ◯ Elsewhere (please specify)

5. How actively is your current LMS being developed by the vendor?

You can select ONE option only.

- ◯ New releases are scheduled which include new functionality
- ◯ Only bug fixes / minor updates are being released
- ◯ No updates are being scheduled at all
- ◯ Don't know

Open Source Library Management Systems Survey

6. When are you next planning to change your LMS?

If you are planning to change LMS but do not have a definitive timescale, please give your best estimate. You can select ONE option only.

- ◯ Before 1st August 2011
- ◯ 1st August 2011 - 31st July 2012
- ◯ 1st August 2012 - 31st July 2013
- ◯ 1st August 2013 - 31st July 2014
- ◯ After 31st July 2014
- ◯ No current plans
- ◯ Don't know

7. Which statement best describes the purchasing process followed when you acquired your current LMS?

You can select ONE option only.

- ◯ Invitation To Tender: advertised in the Official Journal of the European Community as per EU legislation
- ◯ Formal institutional purchasing procedure, but outside of EU tendering legislation
- ◯ Migration from a different product by the same supplier without a formal purchasing procedure
- ◯ Informal purchase from a new supplier
- ◯ Don't know
- ◯ Other (please specify)

8. Which department(s) were responsible for selecting your current LMS?

Please select ALL that apply.

- ☐ Library
- ☐ University / College Senior Management
- ☐ Finance or Procurement Department
- ☐ IT Department
- ☐ Don't know
- ☐ Other (please specify)

9. Are you a member of a resource-sharing consortium / partnership with one or more other libraries (public, academic or commercial)?

- ◯ Yes
- ◯ No

Open Source Library Management Systems Survey

10. Does your consortium / partnership share a LMS?

◯ Yes

◯ No

Question 10 is only asked if Question 9 is answered "Yes".

11. The SCONUL HEFCE Shared Services Study (2009) recommends an "e-Content Licensing Scheme integrated with a total Library Management and Services Platform", one aspect of which is a shared system to manage local print collections and integrate with other local organisational systems, possibly based on an open source model.

Which statement best describes your opinion on this aspect of the proposal?

◯ Interested and would consider adopting such a system

◯ Interested, but will follow developments before considering such a system

◯ Not interested

◯ Unaware of the study

12. Please specify whether you connect your LMS to any of the following other organisational systems, or have plans to do so in the future.

	LMS interacts with this system	Plan to connect with LMS	Would like to connect with LMS	No plans to connect with LMS	Do not use this system
Human Resources / Personnel	◯	◯	◯	◯	◯
University / College Registry	◯	◯	◯	◯	◯
Finance	◯	◯	◯	◯	◯
Virtual Learning Environment – e.g. Blackboard, Moodle	◯	◯	◯	◯	◯
Reading List Management	◯	◯	◯	◯	◯
Metasearch	◯	◯	◯	◯	◯
Link Resolver	◯	◯	◯	◯	◯

13. Do you use an Application Programming Interface (API) with your LMS?

◯ Yes

◯ No

◯ Don't know

Open Source Library Management Systems Survey

14. Why don't you use an API?

Please select ALL that apply.

Question 14 is only asked if Question 13 is answered "No".

- [ ] No current need
- [ ] Licence is too expensive
- [ ] Lack of technical knowledge
- [ ] Don't know what an API does
- [ ] Other (please specify)

15. Does your library currently use any open source software? (e.g. Firefox, Linux, Open Office)

- ◯ Yes
- ◯ No
- ◯ Don't know

16. Which statement best describes your *personal* attitude to open source software?

You can select ONE option only.

- ◯ I always try to use open source software where possible
- ◯ I generally prefer open source software to commercial software
- ◯ I consider open source software equally alongside commercial software
- ◯ I generally prefer commercial software to open source software
- ◯ I never consider using open source software

17. Are you aware of the existence of open source Library Management Systems (e.g. Koha, Evergreen)?

- ◯ Yes
- ◯ No

18. How likely is it that your institution will adopt an open source LMS in the future?

You can select ONE option only.

- ◯ Very likely
- ◯ Quite likely
- ◯ Possibly
- ◯ Unlikely

19. Which statement best describes your institution's current involvement with open source LMS?

You can select ONE option only.

- ◯ We are working on open source LMS in our institution
- ◯ We are engaged with open source LMS developments
- ◯ We are observing open source LMS developments
- ◯ We are not interested in open source LMS

Open Source Library Management Systems Survey

20. Have you ever used an open source LMS?

If you have tested an open source LMS, or tried an open source LMS at a "hands-on" demonstration, please select Yes.

- ◯ Yes
- ◯ No

21. How did your experience of open source LMS influence your views on adopting an open source LMS in your own library?

You can select ONE option only.

- ◯ Much more likely to consider open source LMS
- ◯ Slightly more likely to consider open source LMS
- ◯ It has made no difference
- ◯ Slightly less likely to consider open source LMS
- ◯ Much less likely to consider open source LMS

Question 21 is only asked if Question 20 is answered "Yes".

Open Source Library Management Systems Survey

22. Would *support* from a third party company encourage your library to move to an open source LMS?

e.g. for training, hardware maintenance, installation and upgrades

- ◯ Yes
- ◯ No
- ◯ Don't know

23. Would *hosting* (Software as a Service) from a third party company encourage your library to move to an open source LMS?

- ◯ Yes
- ◯ No
- ◯ Don't know

24. Please indicate whether you agree or disagree with the following statements.

You can select ONE option for EACH statement.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
My institution lacks the staffing needed to maintain an open source LMS	◯	◯	◯	◯	◯
The reputation of open source LMSs is as high as commercial LMSs	◯	◯	◯	◯	◯
Open source LMSs do not fit with our current purchasing procedures – e.g. requirement to go to tender	◯	◯	◯	◯	◯
There is sufficient documentation to support open source LMSs	◯	◯	◯	◯	◯
My institution lacks the technical expertise needed to maintain an open source LMS	◯	◯	◯	◯	◯
We would be concerned about maintaining local customisation of an open source LMS during upgrades	◯	◯	◯	◯	◯
Open source LMSs are sufficiently customised for the UK market	◯	◯	◯	◯	◯
We wouldn't want to be the first UK higher education library to move to an open source LMS	◯	◯	◯	◯	◯

Open Source Library Management Systems Survey

25. Listed below are some of the most commonly cited advantages of open source software.

Please indicate how beneficial each would be, *applied to your LMS*, on a scale of 1 - 5 (where 1 is of no benefit and 5 is extremely beneficial).

You can select ONE option for EACH ststement.

	1 - No Benefit	2	3 - No Strong Opinion	4	5 - Extremely Beneficial
Free software cost	◯	◯	◯	◯	◯
The existence of online development and support forums	◯	◯	◯	◯	◯
Greater adherence to open standards in open source software	◯	◯	◯	◯	◯
Access to underlying data for interoperability with other systems	◯	◯	◯	◯	◯
Ability to download and test the software in advance	◯	◯	◯	◯	◯
Independence from suppliers in choosing support and maintenance	◯	◯	◯	◯	◯
Access to the source code to customise the software	◯	◯	◯	◯	◯

26. Please add any further comments on open source Library Management Systems here.

27. How many staff work for your institution's library service?

- ◯ 1- 10
- ◯ 11 - 25
- ◯ 26 - 50
- ◯ 51 - 100
- ◯ 101 - 250
- ◯ 251 or more

28. If you are willing to participate in a short interview (maximum 30 minutes) in person or via telephone to discuss your views in more detail, please provide your name and email address or telephone number here:

29. Thank you very much for completing this survey. If you are interested in receiving a copy of the results, please provide your email address here:

Appendix D: Correspondence with David Kay

[removed for confidentiality]

Appendix E1: Questionnaire invitation email

I am studying a Masters degree with Aberystwyth University and am currently researching open source Library Management Systems for the dissertation. As part of this research I am conducting a survey to investigate the views of UK higher education libraries towards open source systems.

I have found your contact details on the website of your institution, and would very much appreciate your response to the survey, which will close on 7th February. All replies will be treated in confidence and can be anonymous. The survey will take approximately 10 - 15 minutes to complete and is available here:
http://www.surveymonkey.com/s/opensourcelms

If you are not responsible for the systems in your library service, I would be very grateful if you could forward on this message to a member of staff who can complete the survey. If you have any questions or would like further information about this research, please contact me by email at jmd07@aber.ac.uk

Thank you very much for your help. Your reply is very valuable as a high response rate is crucial for the validity of the research.

John Dalling
Student in MSc Econ Information and Library Studies
6th January 2011

Appendix E2: Questionnaire reminder email

Note: Based on follow-up reminder (Bourque & Fielder, 2003, p. 164)

On 6th January, I sent you a link to a survey I am conducting on open source Library Management Systems as part of my Masters dissertation with Aberystwyth University.

If you have already responded, thank you very much for your help and please ignore this reminder. If you haven't yet responded, I would be very grateful for your feedback. The survey closes on 7th February and is available here: **http://www.surveymonkey.com/s/opensourcelms**

The survey will take approximately 10 - 15 minutes to complete. All replies will be treated in confidence and can be anonymous.

If you are not responsible for the systems in your library service, please forward on this message to a member of staff who can complete the survey. If you have any questions or would like further information about this research, please contact me by email at jmd07@aber.ac.uk

Thank you very much for your help.

John Dalling

Appendix F: Summary results from Survey Monkey

Note: Expanded free-text answers removed to ensure confidentiality.

Open Source Library Management Systems Survey SurveyMonkey

1. What Library Management System (LMS) do you currently use?
Examples of products: Voyager, Horizon, Millennium
Examples of vendors: Ex Libris, SirsiDynix, Innovative Interfaces

	Response Percent	Response Count
Product	100.0%	84
Vendor	100.0%	84
answered question		84
skipped question		0

2. In what year did you purchase your current LMS?

	Response Count
	75
answered question	75
skipped question	9

3. How satisfied are you with your...

	Very Satisfied	Satisfied	Undecided	Dissatisfied	Very Dissatisfied	Response Count
current LMS?	8.3% (7)	64.3% (54)	13.1% (11)	14.3% (12)	0.0% (0)	84
current vendor?	8.4% (7)	54.2% (45)	20.5% (17)	15.7% (13)	1.2% (1)	83
current support?	9.8% (8)	59.8% (49)	15.9% (13)	14.6% (12)	0.0% (0)	82
answered question						84
skipped question						0

4. Where is your LMS server currently hosted?
You can select ONE option only. If your institution has an integrated library and IT department, and your server is located within this department, please choose "Within your library service".

	Response Percent	Response Count
Within your library service	19.0%	16
In the IT Department	**64.3%**	**54**
Externally - by another institution	11.9%	10
Externally - by the vendor (Software-as-a-Service)	0.0%	0
Elsewhere (please specify)	4.8%	4
	answered question	**84**
	skipped question	**0**

5. How actively is your current LMS being developed by the vendor?
You can select ONE option only.

	Response Percent	Response Count
New releases are scheduled which include new functionality	**79.8%**	**67**
Only bug fixes / minor updates are being released	15.5%	13
No updates are being scheduled at all	1.2%	1
Don't know	3.6%	3
	answered question	**84**
	skipped question	**0**

6. When are you next planning to change your LMS?
If you are planning to change LMS but do not have a definitive timescale, please give your best estimate.
You can select ONE option only.

	Response Percent	Response Count
Before 1st August 2011	3.6%	3
1st August 2011 - 31st July 2012	4.8%	4
1st August 2012 - 31st July 2013	3.6%	3
1st August 2013 - 31st July 2014	10.7%	9
After 31st July 2014	2.4%	2
No current plans	**69.0%**	**58**
Don't know	6.0%	5
	answered question	**84**
	skipped question	**0**

7. Which statement best describes the purchasing process followed when you acquired your current LMS?
You can select ONE option only.

	Response Percent	Response Count
Invitation To Tender: advertised in the Official Journal of the European Community as per EU legislation	**41.0%**	**34**
Formal institutional purchasing procedure, but outside of EU tendering legislation	19.3%	16
Migration from a different product by the same supplier without a formal purchasing procedure	6.0%	5
Informal purchase from a new supplier	4.8%	4
Don't know	24.1%	20
Other (please specify)	4.8%	4
	answered question	**83**
	skipped question	**1**

8. Which department(s) were responsible for selecting your current LMS?
Please select ALL that apply.

	Response Percent	Response Count
Library	**91.7%**	**77**
University / College Senior Management	17.9%	15
Finance or Procurement Department	13.1%	11
IT Department	34.5%	29
Don't know	6.0%	5
Other (please specify)	8.3%	7
answered question		**84**
skipped question		**0**

9. Are you a member of a resource-sharing consortium / partnership with one or more other libraries (public, academic or commercial)?

	Response Percent	Response Count
Yes	25.0%	21
No	**75.0%**	**63**
answered question		**84**
skipped question		**0**

10. Does your consortium / partnership share a LMS?

	Response Percent	Response Count
Yes	47.6%	10
No	**52.4%**	**11**
	answered question	**21**
	skipped question	**63**

11. The SCONUL HEFCE Shared Services Study (2009) recommends an "e-Content Licensing Scheme integrated with a total Library Management and Services Platform", one aspect of which is a shared system to manage local print collections and integrate with other local organisational systems, possibly based on an open source model.

Which statement best describes your opinion on this aspect of the proposal?

	Response Percent	Response Count
Interested and would consider adopting such a system	15.2%	12
Interested, but will follow developments before considering such a system	**68.4%**	**54**
Not interested	3.8%	3
Unaware of the study	12.7%	10
	answered question	**79**
	skipped question	**5**

12. Please specify whether you connect your LMS to any of the following other organisational systems, or have plans to do so in the future.

	LMS interacts with this system	Plan to connect with LMS	Would like to connect with LMS	No plans to connect with LMS	Do not use this system	Response Count
Human Resources / Personnel	24.7% (18)	8.2% (6)	21.9% (16)	**35.6% (26)**	9.6% (7)	73
University / College Registry	**70.5% (55)**	5.1% (4)	12.8% (10)	9.0% (7)	2.6% (2)	78
Finance	11.0% (8)	12.3% (9)	**46.6% (34)**	23.3% (17)	6.8% (5)	73
Virtual Learning Environment – e.g. Blackboard, Moodle	25.0% (19)	7.9% (6)	**34.2% (26)**	31.6% (24)	1.3% (1)	76
Reading List Management	**35.5% (27)**	5.3% (4)	13.2% (10)	15.8% (12)	30.3% (23)	76
Metasearch	**39.7% (29)**	8.2% (6)	13.7% (10)	12.3% (9)	26.0% (19)	73
Link Resolver	**51.3% (39)**	5.3% (4)	11.8% (9)	17.1% (13)	14.5% (11)	76
					answered question	81
					skipped question	3

13. Do you use an Application Programming Interface (API) with your LMS?

	Response Percent	Response Count
Yes	**51.3%**	**41**
No	33.8%	27
Don't know	15.0%	12
answered question		80
skipped question		4

14. Why don't you use an API?
Please select ALL that apply.

	Response Percent	Response Count
No current need	26.9%	7
Licence is too expensive	19.2%	5
Lack of technical knowledge	23.1%	6
Don't know what an API does	**30.8%**	**8**
Other (please specify)	19.2%	5
	answered question	**26**
	skipped question	**58**

15. Does your library currently use any open source software? (e.g. Firefox, Linux, Open Office)

	Response Percent	Response Count
Yes	**68.8%**	**55**
No	28.8%	23
Don't know	2.5%	2
	answered question	**80**
	skipped question	**4**

16. Which statement best describes your *personal* attitude to open source software?
You can select ONE option only.

	Response Percent	Response Count
I always try to use open source software where possible	6.4%	5
I generally prefer open source software to commercial software	5.1%	4
I consider open source software equally alongside commercial software	**70.5%**	**55**
I generally prefer commercial software to open source software	15.4%	12
I never consider using open source software	2.6%	2
	answered question	**78**
	skipped question	**6**

17. Are you aware of the existence of open source Library Management Systems (e.g. Koha, Evergreen)?

	Response Percent	Response Count
Yes	**83.8%**	**67**
No	16.3%	13
	answered question	**80**
	skipped question	**4**

18. How likely is it that your institution will adopt an open source LMS in the future?
You can select ONE option only.

	Response Percent	Response Count
Very likely	2.5%	2
Quite likely	7.5%	6
Possibly	**52.5%**	**42**
Unlikely	37.5%	30
	answered question	**80**
	skipped question	**4**

19. Which statement best describes your institution's current involvement with open source LMS?
You can select ONE option only.

	Response Percent	Response Count
We are working on open source LMS in our institution	0.0%	0
We are engaged with open source LMS developments	6.3%	5
We are observing open source LMS developments	**72.5%**	**58**
We are not interested in open source LMS	21.3%	17
	answered question	**80**
	skipped question	**4**

20. Have you ever used an open source LMS?
If you have tested an open source LMS, or tried an open source LMS at a "hands-on" demonstration, please select Yes.

	Response Percent	Response Count
Yes	26.3%	21
No	**73.8%**	**59**
	answered question	**80**
	skipped question	**4**

21. How did your experience of open source LMS influence your views on adopting an open source LMS in your own library?
You can select ONE option only.

	Response Percent	Response Count
Much more likely to consider open source LMS	4.8%	1
Slightly more likely to consider open source LMS	28.6%	6
It has made no difference	**42.9%**	**9**
Slightly less likely to consider open source LMS	23.8%	5
Much less likely to consider open source LMS	0.0%	0
	answered question	**21**
	skipped question	**63**

22. Would *support* from a third party company encourage your library to move to an open source LMS?
e.g. for training, hardware maintenance, installation and upgrades

	Response Percent	Response Count
Yes	60.8%	48
No	11.4%	9
Don't know	27.8%	22
answered question		79
skipped question		5

23. Would *hosting* (Software as a Service) from a third party company encourage your library to move to an open source LMS?

	Response Percent	Response Count
Yes	32.9%	26
No	24.1%	19
Don't know	43.0%	34
answered question		79
skipped question		5

24. Please indicate whether you agree or disagree with the following statements.
You can select ONE option for EACH statement.

	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree	Response Count
My institution lacks the staffing needed to maintain an open source LMS	6.4% (5)	17.9% (14)	21.8% (17)	**34.6% (27)**	19.2% (15)	78
The reputation of open source LMSs is as high as commercial LMSs	5.1% (4)	37.2% (29)	**41.0% (32)**	14.1% (11)	2.6% (2)	78
Open source LMSs do not fit with our current purchasing procedures – e.g. requirement to go to tender	5.1% (4)	**41.8% (33)**	32.9% (26)	16.5% (13)	3.8% (3)	79
There is sufficient documentation to support open source LMSs	0.0% (0)	24.4% (19)	**59.0% (46)**	16.7% (13)	0.0% (0)	78
My institution lacks the technical expertise needed to maintain an open source LMS	7.6% (6)	**39.2% (31)**	19.0% (15)	24.1% (19)	10.1% (8)	79
We would be concerned about maintaining local customisation of an open source LMS during upgrades	1.3% (1)	10.1% (8)	29.1% (23)	**48.1% (38)**	11.4% (9)	79
Open source LMSs are sufficiently customised for the UK market	1.3% (1)	12.7% (10)	**77.2% (61)**	8.9% (7)	0.0% (0)	79
We wouldn't want to be the first UK higher education library to move to an open source LMS	1.3% (1)	16.5% (13)	19.0% (15)	**43.0% (34)**	20.3% (16)	79
					answered question	**79**
					skipped question	**5**

25. Listed below are some of the most commonly cited advantages of open source software.
Please indicate how beneficial each would be, *applied to your LMS*, on a scale of 1 - 5 (where 1 is of no benefit and 5 is extremely beneficial).
You can select ONE option for EACH ststement.

	1 - No Benefit	2	3 - No Strong Opinion	4	5 - Extremely Beneficial	Response Count
Free software cost	0.0% (0)	3.8% (3)	16.5% (13)	27.8% (22)	**51.9% (41)**	79
The existence of online development and support forums	0.0% (0)	5.1% (4)	20.5% (16)	**48.7% (38)**	25.6% (20)	78
Greater adherence to open standards in open source software	0.0% (0)	5.1% (4)	25.3% (20)	**49.4% (39)**	20.3% (16)	79
Access to underlying data for interoperability with other systems	0.0% (0)	3.8% (3)	16.5% (13)	**49.4% (39)**	30.4% (24)	79
Ability to download and test the software in advance	1.3% (1)	3.8% (3)	19.2% (15)	**47.4% (37)**	28.2% (22)	78
Independence from suppliers in choosing support and maintenance	3.8% (3)	7.7% (6)	21.8% (17)	**42.3% (33)**	24.4% (19)	78
Access to the source code to customise the software	5.1% (4)	12.7% (10)	20.3% (16)	**35.4% (28)**	26.6% (21)	79
					answered question	**79**
					skipped question	**5**

26. Please add any further comments on open source Library Management Systems here.

	Response Count
	18
answered question	**18**
skipped question	**66**

27. How many staff work for your institution's library service?			
		Response Percent	Response Count
1- 10		**21.8%**	**17**
11 - 25		17.9%	14
26 - 50		12.8%	10
51 - 100		**21.8%**	**17**
101 - 250		**21.8%**	**17**
251 or more		3.8%	3
		answered question	**78**
		skipped question	**6**

Appendix G: Codebook for questionnaire analysis

Question	Variable name	Values	Type	Measure
1. What Library Management System (LMS) do you currently use? **a. Product**	LMS num	1 Advance 2 Aleph 3 Alice 4 Alto 5 Eclipse 2 6 Heritage 7 Horizon 8 Liberty 4 9 Millennium 10 Olib 11 Symphony 12 Talis 13 Unicorn 14 Voyager 15 VSmart 99 (Blank)	Numeric	Nominal
b. Vendor	VendorNum	1 Ex Libris 2 Infor 3 Innovative Interfaces 4 IS Oxford 5 Microlibrarian 6 OCLC 7 SirsiDynix 8 Softlink 9 Talis 99 (Blank)	Numeric	Nominal
2. In what year did you purchase your current LMS?	PurchaseDate	(*4 digit year*) 99 (Blank)	Numeric	Scale
3. How satisfied are you with your: **a. current LMS?**	SatLMS	1 Very Satisfied 2 Satisfied	Numeric	Ordinal

		3 4 5 99	Undecided Dissatisfied Very Dissatisfied (Blank)		
b. current vendor?	SatVendor	1 2 3 4 5 99	Very Satisfied Satisfied Undecided Dissatisfied Very Dissatisfied (Blank)	Numeric	Ordinal
c. current support?	SatSupport	1 2 3 4 5 99	Very Satisfied Satisfied Undecided Dissatisfied Very Dissatisfied (Blank)	Numeric	Ordinal
4. Where is your LMS server currently hosted?	WhereHosted	1 2 3 4 5 6 99	Within your library service In the IT Department Externally - by another institution Externally - by the vendor Shared with Public Library Externally - by hosting company (Blank)	Numeric	Nominal
5. How actively is your current LMS being developed by the vendor?	ActivelyDeveloped	1 2 3 4 99	New releases are scheduled which include new functionality Only bug fixes / minor updates are being released No updates are being scheduled at all Don't know (Blank)	Numeric	Nominal

6. When are you next planning to change your LMS?	ChangeLMS	1 2 3 4 5 6 7 99	Before 1st August 2011 1st August 2011 - 31st July 2012 1st August 2012 - 31st July 2013 1st August 2013 - 31st July 2014 After 31st July 2014 No current plans Don't know (Blank)	Numeric	Nominal*
7. Which statement best describes the purchasing process followed when you acquired your current LMS?	Purchasing Process	1 2 3 4 5 6 99	Invitation To Tender: advertised in the Official Journal of the European Community as per EU legislation Formal institutional purchasing procedure, but outside of EU tendering legislation Migration from a different product by the same supplier without a formal purchasing procedure Informal purchase from a new supplier Don't know Other (please specify) (Blank)	Numeric	Nominal
8. Which department(s) were responsible for selecting your current LMS? **a. Library**	PLib	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
b. SMT	PSMT	1	Selected	Numeric	Nominal

		2	Not selected		(Dichotomous)
c. Finance	PFinance	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
d. IT	PIT	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
e. Don't know	PDontKnow	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
f. Another institution	PAnotherInst	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
g. Academics	PAcademics	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
h. Library user committee	PLibUserCtte	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
i. Education department to which the Library belongs	PEduDept	1 2	Selected Not selected	Numeric	Nominal (Dichotomous)
9. Are you a member of a resource-sharing consortium / partnership with one or more other libraries (public, academic or commercial)?	Consortium	1 2 99	Yes No (Blank)	Numeric	Nominal
10. Does your consortium / partnership share a LMS?	ConsShareLMS	1 2 98 99	Yes No N/A (not in consortium) (Blank)	Numeric	Nominal
11. The SCONUL HEFCE Shared Services Study (2009) recommends an "e-Content	SCONULShareLMS	1 2	Interested and would consider adopting such a system Interested, but will follow	Numeric	Nominal

Licensing Scheme integrated with a total Library Management and Services Platform"... Which statement best describes your opinion on this aspect of the proposal?		developments before considering such a system 3 Not interested 4 Unaware of the study 99 (Blank)		
12. Please specify whether you connect your LMS to any of the following other organisational systems, or have plans to do so in the future. **a. HR / Personnel**	ConnectHR	1 LMS interacts with this system 2 Plan to connect with LMS 3 Would like to connect with LMS 4 No plans to connect with LMS 5 Do not use this system 99 (Blank)	Numeric	Nominal
b. Registry	ConnectRegistry	1 LMS interacts with this system 2 Plan to connect with LMS 3 Would like to connect with LMS 4 No plans to connect with LMS 5 Do not use this system 99 (Blank)	Numeric	Nominal
c. Finance	ConnectFinance	1 LMS interacts with this system 2 Plan to connect with LMS 3 Would like to connect with LMS 4 No plans to connect with LMS 5 Do not use this system 99 (Blank)	Numeric	Nominal
d. VLE	ConnectVLE	1 LMS interacts with this system 2 Plan to connect with LMS 3 Would like to connect with LMS 4 No plans to connect with LMS 5 Do not use this system 99 (Blank)	Numeric	Nominal

e. Reading List	ConnectReadingList	1 2 3 4 5 99	LMS interacts with this system Plan to connect with LMS Would like to connect with LMS No plans to connect with LMS Do not use this system (Blank)	Numeric	Nominal
f. Metasearch	ConnectMetasearch	1 2 3 4 5 99	LMS interacts with this system Plan to connect with LMS Would like to connect with LMS No plans to connect with LMS Do not use this system (Blank)	Numeric	Nominal
g. Link Resolver	ConnectLinkResolver	1 2 3 4 5 99	LMS interacts with this system Plan to connect with LMS Would like to connect with LMS No plans to connect with LMS Do not use this system (Blank)	Numeric	Nominal
13. Do you use an API with your LMS?	APIUse	1 2 3 99	Yes No Don't know (Blank)	Numeric	Nominal
14. Why don't you use an API? **a. No current need**	APINoNeed	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)
b. Licence is too expensive	APITooExpensive	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)
c. Lack of technical knowledge	APILackKnowledge	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)

d. Don't know what an API does	APIDontKnow	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)
e. Not available	APINotAvailable	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)
f. Intending to use Juice	APIJuice	1 2	Selected Not Selected	Numeric	Nominal (Dichotomous)
15. Does your library currently use any open source software?	LibUseOS	1 2 3 99	Yes No Don't know (Blank)	Numeric	Nominal
16. Which statement best describes your personal attitude to open source software?	PersonalOs	1 2 3 4 5 99	I always try to use open source software where possible I generally prefer open source software to commercial software I consider open source software equally alongside commercial software I generally prefer commercial software to open source software I never consider using open source software (Blank)	Numeric	Ordinal
17. Are you aware of the existence of open source Library Management Systems (e.g. Koha, Evergreen)?	OSLMSAware	1 2 99	Yes No (Blank)	Numeric	Nominal
18. How likely is it that your institution will adopt an open source LMS in the future?	OSLMSLikelyAdopt	1 2 3	Very likely Quite likely Possibly	Numeric	Ordinal

		4 99	Unlikely (Blank)		
19. Which statement best describes your institution's current involvement with open source LMS?	OSLMSCurrentInvolvement	1 2 3 4 99	We are working on open source LMS in our institution We are engaged with open source LMS developments We are observing open source LMS developments We are not interested in open source LMS (Blank)	Numeric	Ordinal
20. Have you ever used an open source LMS?	OSLMSEverUsed	1 2 99	Yes No (Blank)	Numeric	Nominal
21. How did your experience of open source LMS influence your views on adopting an open source LMS in your own library?	OSLMSExperienceInfluence	1 2 3 4 5 98 99	Much more likely to consider open source LMS Slightly more likely to consider open source LMS It has made no difference Slightly less likely to consider open source LMS Much less likely to consider open source LMS N/A (never used) (Blank)	Numeric	Ordinal
22. Would support from a third party company encourage your library to move to an open source LMS?	OSLMSSupportEncourage	1 2 3 99	Yes No Don't know (Blank)	Numeric	Nominal
23. Would hosting from a third party company encourage your library to move to an open source LMS?	OSLMSHostingEncourage	1 2 3 99	Yes No Don't know (Blank)	Numeric	Nominal
24. Please indicate whether you	AODLackStaffing	1	Strongly disagree	Numeric	Scale**

agree or disagree with the following statements. **a. My institution lacks the staffing needed to maintain an open source LMS**		2 Disagree 3 Undecided 4 Agree 5 Strongly agree 99 (Blank)		
b. The reputation of open source LMSs is as high as commercial LMSs	AODReputationHighAsCommercial	1 Strongly disagree 2 Disagree 3 Undecided 4 Agree 5 Strongly agree 99 (Blank)	Numeric	Scale**
c. Open source LMSs do not fit with our current purchasing procedures	AODNotFitPurchasing	1 Strongly disagree 2 Disagree 3 Undecided 4 Agree 5 Strongly agree 99 (Blank)	Numeric	Scale**
d. There is sufficient documentation to support open source LMSs	AODSufficientDocumentation	1 Strongly disagree 2 Disagree 3 Undecided 4 Agree 5 Strongly agree 99 (Blank)	Numeric	Scale**
e. My institution lacks the technical expertise needed to maintain an open source LMS	AODLackTechExpertise	1 Strongly disagree 2 Disagree 3 Undecided 4 Agree 5 Strongly agree 99 (Blank)	Numeric	Scale**
f. We would be concerned about maintaining local customisation of an open source LMS during	AODConcernedLocalCustomisation	1 Strongly disagree 2 Disagree 3 Undecided 4 Agree	Numeric	Scale**

upgrades		5 99	Strongly agree (Blank)		
g. Open source LMSs are sufficiently customised for the UK market	AODSufficientlyCustomisedUK	1 2 3 4 5 99	Strongly disagree Disagree Undecided Agree Strongly agree (Blank)	Numeric	Scale**
h. We wouldn't want to be the first UK higher education library to move to an open source LMS	AODNotFirstUK	1 2 3 4 5 99	Strongly disagree Disagree Undecided Agree Strongly agree (Blank)	Numeric	Scale**
25. Listed below are some of the most commonly cited advantages of open source software. Please indicate how beneficial each would be, applied to your LMS, on a scale of 1 – 5. **a. Free software cost**	AdvFreeCost	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
b. The existence of online development and support forums	AdvOnlineForums	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
c. Greater adherence to open standards in open source software	AdvAdhereOpenStandards	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
d. Access to underlying data	AdvInteroperability	1	No benefit	Numeric	Scale**

for interoperability with other systems		2 3 4 5 99	 Extremely beneficial (Blank)		
e. Ability to download and test the software in advance	AdvTestAdvance	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
f. Independence from suppliers in choosing support and maintenance	AdvSupplierIndependence	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
g. Access to the source code to customise the software	AdvSourceCodeAccess	1 2 3 4 5 99	No benefit Extremely beneficial (Blank)	Numeric	Scale**
26. Please add any further comments on open source Library Management Systems here.	Comments	*(free text)*		String	Nominal
27. How many staff work for your institution's library service?	NoLibStaff	1 2 3 4 5 6 99	1 – 10 11 – 25 26 – 50 51 – 100 101 – 250 251 or more (Blank)	Numeric	Ordinal

28. If you are willing to participate in a short interview in person or via telephone to discuss your views in more detail, please provide your name and email address or telephone number here:	InterviewEmail	*(free text)*	String	Nominal

Notes:

* Treated as nominal rather than an ordinal or interval variable due to the addition of “no current plans” and “don’t know”.

**Likert scales “strictly speaking produce ordinal variables”, but “many writers argue that they can be treated as though they produce interval / ratio variables” (Bryman, 2008, p. 322). For the purposes of this research they have been treated as scale values in SPSS.

Appendix H: Spreadsheet for interview analysis

[removed for confidentiality]

Appendix I: Interview schedule

Note: Question highlighted in red was used in the pilot interview only and removed for the five final interviews.

Introduction

Thank you for agreeing to be interviewed. This interview is intended to further explore your views towards open source library management systems and to provide some background to the results of the survey conducted earlier this year.

- *Check whether participant consents to the interview being recorded and transcribed*

General

1. When did you first hear about open source LMSs?
2. Where have you heard about open source LMSs?
3. Have you ever used an open source LMS, or seen a demonstration?

   If YES

   a. Which LMS did you use / see?
   b. How did you think it compares to your existing LMS?
   c. One comment from the survey was that the OPAC of open source LMSs is generally good, but the remaining modules lack the sophistication and functionality required – particularly acquisitions, serials and cataloguing. Would you agree with this view?

   If NO

   d. Have you considered downloading and trying an open source LMS?
   e. If not, why not?

Selection

4. Will you follow a formal tendering process for selecting your next LMS?

   If YES

   a. Could this impact on selecting an open source LMS?
5. Can you think of any advantages to open source LMSs, over commercial LMSs, which would encourage your institution to select one? If so, please state....
6. Can you think of any disadvantages to open source LMSs, compared to commercial LMSs, which would discourage your institution from selecting one? If so, please state....
7. What changes, if any, would need to be made in your institution or library to adopt an open source LMS?

8. 63% of respondents to the survey agreed that they wouldn't want to be the first UK higher education institution to adopt an open source LMS. Why do you think institutions are reluctant to be the first to adopt one?
9. Staffordshire University have recently announced that they will be adopting the Koha open source LMS. Do you believe this will encourage other institutions to consider open source LMS? (If so, why?)

Despite open source software being free from financial cost, it has been argued that the total cost of ownership is no different to commercial software. Thinking about library management systems in particular, do you agree with this? Why / why not?

Hosting and support

10. No survey respondents currently use commercial hosting (Software as a Service) for their LMS. Would you consider commercial hosting for your LMS?
    a. **If YES** – What benefits to do see from commercial hosting?
    b. **If NO** – Why not?
11. 61% of survey respondents believed third party support would encourage them to move to an open source LMS, while only 33% thought that third party hosting would encourage them to do so. Why do you think support is seen as more attractive than hosting?
12. Do you think that better support would also encourage people to move to a different **commercial** LMS as well as an open source LMS?
13. There are not many companies in the UK supporting open source LMS. Do you think a greater choice of support companies would encourage institutions to take up open source LMS?

Staffing

14. Do you feel an open source LMS would require more technical expertise than your current LMS?
    a. **If YES** – What technical knowledge do you think would be required?
    b. **If YES** – Do you think third party support or hosting could help reduce the need for technical expertise?
15. Do you think an open source LMS would require more staff time than your current LMS?
    a. **If YES** – In what areas do you feel more time would be required?
    b. **If YES** – Do you think third party support or hosting could help reduce the staff time required?

Interoperability

16. Do you think open source LMS could offer greater connectivity with other institutional systems compared to commercial systems?
    a. **If YES** – How?
    b. **If NO** – Why not?

Development

17. How do you think the use of LMSs by UK academic libraries may differ from that of other countries and sectors?
    a. Do you think these needs are currently addressed in your LMS?
    b. Would you be concerned that an open source LMS may not be tailored to these local and sectoral requirements?
18. Would you be interested in making changes to the source code of an open source LMS?
    a. **If YES** – What changes might you make?
    b. **If YES** – Would you be discouraged from doing this by worrying about retaining compatibility with new versions of the software?
19. One problem with open source software is the issue of forking, where a program is taken in different directions by separate developers to the extent that altered versions no longer remain compatible.
    How do you feel this could impact on a LMS?

Consortia

20. Do you think that the current trend towards consortia might impact on the take-up of open source LMSs?
    a. **If YES** – How?

End

21. Do you have any further comments about open source LMSs?

Thank participant and close.

Appendix J: Interview transcripts

[removed for confidentiality]

Appendix K: Interview invitation and consent form

Thank you for completing my survey on open source Library Management Systems earlier this year, and for offering to take part in an interview. I have now analysed the survey results and would be very grateful if you could take part, if you are still willing to do so.

Please can you let me know if you are happy to participate, and if so whether you would be available on any of the following dates, at a time to suit you?

7th April - between 9am and 3pm
18th April - between 9am and 5pm
19th April - between 9am and 5pm
20th April - between 9am and 5pm
21st April - between 9am and 5pm

The interview should take no more than 30 minutes.

As I would like to interview people from a variety of locations around the UK, the interviews will be conducted by telephone and recorded for transcription. I would like to include some of the transcriptions in my dissertation, but am happy to omit them on request.

If you are happy to participate, please can you confirm:

(1) Are you willing for your interview to be recorded? **YES / NO**
(2) Are you willing for a transcription of your interview to be included in my dissertation? **YES / NO**
(3) Would you prefer your comments to be anonymised in the dissertation? **YES / NO**
(4) The telephone number you would like to be called at:

Many thanks again for your help.

John Dalling
MSc Econ Information and Library Studies student
Aberystwyth University *2nd April 2011*